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SKETCHES IN NATURAL HISTORY.

HISTORY

OF

THE MAMMALIA.

VOLS. V. & VI.

ORDER—RUMINANTIA.

WITH NUMEROUS ILLUSTRATIONS.

IN SIX VOLUMES.

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SKETCH

OF THE

HISTORY OF THE MAMMALIA.

Order—RUMINANTIA.

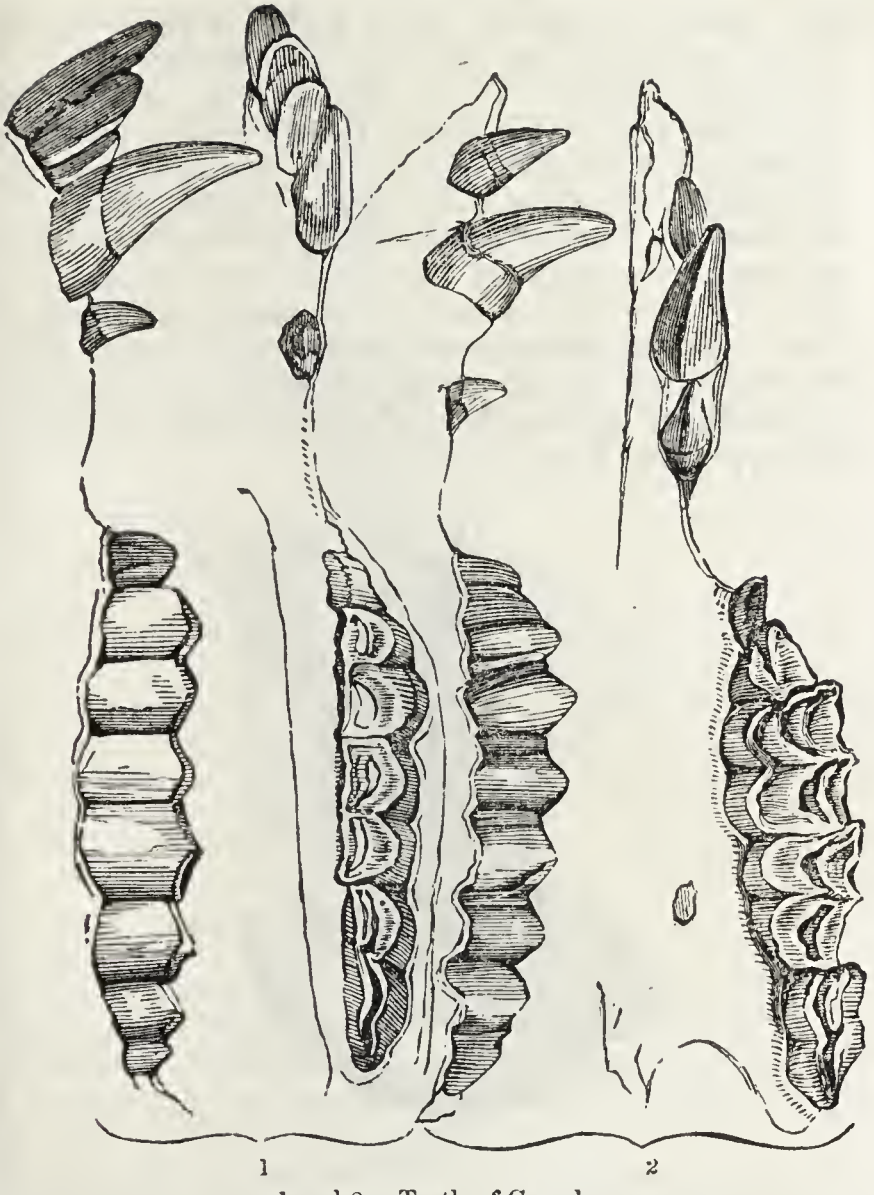
This order, termed Pecora by Linnæus, is one of the most natural of the primary groups into which the mammalia are divided. It contains all those quadrupeds in which a cloven hoof, the act of rumination (chewing the cud), and the absence of incisors in the upper jaw coexist together as data upon which to draw a line between them and all other mammals. It is true that the *Camelidæ*, or camel tribe, including the llamas, exhibit in their dentition a departure from the rule, and exhibit, both in this particular and in osteological structure, some approximation to the Pachyderms; nevertheless even the camels, in common with the Ruminants generally, partake of those definite structural peculiarities from which there is no deviation, and which constitute a common bond of union.

A rapid glance at the distinguishing characteristics of this order will not, we trust, be unacceptable; certainly it is not out of place. Decidedly herbivorous, with lips modified either for browsing, as the camel, giraffe, &c., or for grazing, as in the ox, the Ruminantia are accordingly furnished with teeth, digestive organs, and limbs in accordance with the habits involved.

To begin with the teeth. We may observe that there are no incisors in the upper jaw, the hardened gum sustaining the pressure of the lower incisors, which are eight in number, with thin, broad edges; their position is not vertical, but oblique, so that their edges do not press directly against the gum, but rather their posterior surface. The two central are in general the largest, and the outermost on each side the smallest and most oblique. In the giraffe, however, the outermost is the largest, and it appears as if divided by a furrow. The molars are six on each side in both jaws: of these the first three are preceded by milk or deciduous teeth; the three posterior are originally permanent. Their surface is marked by two pairs of crescentic ridges. In the lower jaw these crescents have the convexity outwards; in the upper, the reverse. These crescents as they wear down by use show a centre of bone surrounded by a ridge of enamel. Between the molars and incisors of the lower jaw intervenes a vacant space.

With respect to the camels, though the number of molars on each side above is really six, five only are in a continuous series, and resemble molars in their shape: anterior to these continuous teeth, and separated by a considerable space, we find a tooth resembling in shape a stout short canine, being of a simple conical figure; this is the first molar: it has been called a second canine, but erroneously, the true canine, which is large, strong, and pointed, being placed before it, a small interval separating them. In the lower jaw the continuous molars are four, with a similar pointed and detached molar and canine; there being true canines, as well as canine-like molars, in both jaws. Incisors also are found in both jaws: four in the upper, but the two central are small and fall out early; the two lateral are permanent, and resemble canines in figure. In the lower jaw there are only six incisors, compressed, oblique, and pointed. Fig. 1 shows the dentition of the upper jaw, in two views; Fig. 2, that of the lower, also in two views.

The dentition of the llamas closely approaches that of the camel; there are, however, in these animals only



1 and 2.—Teeth of Camel.

four molars on each side below, and five above, there being no detached canine-like molars. The Chevrotains (*Moschidæ*) are remarkable for the development of the canines of the upper jaw in the male; they are pointed, recurved, compressed, with a posterior sharp edge, and project downwards out of the mouth. In the musk-deer

they measure two inches and a half in length. There are no canines in the lower jaw. Incisors eight, as usual; none above. The existence of canine teeth in the upper jaw of the males, though not a universal feature among the Ruminants, is by no means uncommon. They occur in the males of many of the deer tribe, and we have seen them in a rudimentary state and buried in the gum in the female of the South American species; and they have been found in one species of antelope (*Ant. montana*, Rüpp.)—in this animal, however, they are only half-developed germs, becoming lost before the animal attains to maturity. (See 'Proceeds. Zoological Society,' 1836, p. 3.)

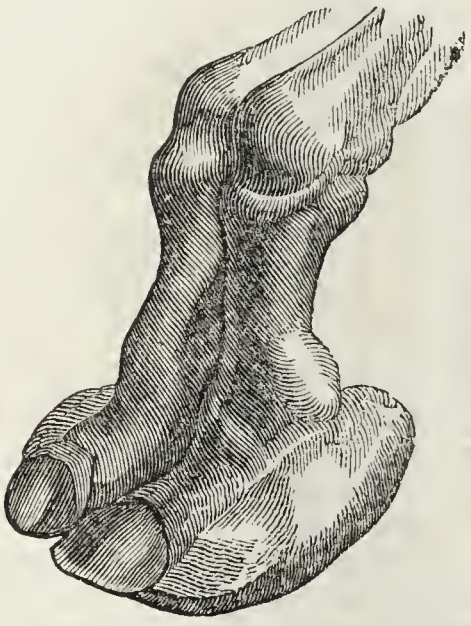


Fig. 3.

As the dentition of the Ruminants is so constant and unvarying in its general characters, so is the structure of the organs of progression; and where, as in the *Camelidæ*, we find a variation in the former, so do we also find a corresponding variation in the latter. On looking at the feet of a Ruminant, the first thing we observe is, that they are hoofed and cloven; an anatomy shows us

that these hoof-cased toes, consisting of three phalangal bones, terminate a single long canon-bone. In the camels, however, the toes, instead of being short, abruptly truncated, and cased in pointed hoofs, so as to form a solid basis on which to rest, are elongated and only tipped with small hoofs, the animal resting on a large pulpy sole or pad, placed like a cushion beneath the toes. (See

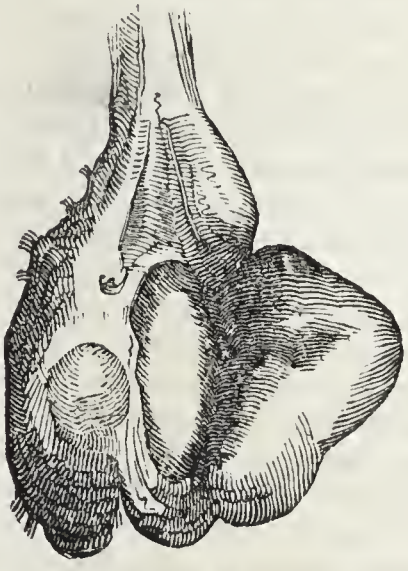


Fig. 4.

Figs. 3 and 4.) Besides the two large or true toes, there are in some groups, as for instance the deer, two small short lateral toes consisting of three phalanges, and supported by stylets of bone. In the sheep these accessory toes are merely horny protuberances filled with condensed fatty cellular tissue.

The act of ruminating supposes a complicated structure of the stomach. This organ is divided into four compartments, viz.: 1, the first cavity or paunch, la panse (*ventriculus*); 2, the hood or honey-comb, le bonnet (*reticulum*); 3, the manyplies, le feuillet (*omasus* or *psalterium*); 4, the rud, la caillette (*abomasus*). These cavities are so arranged that the coarsely-ground herbage

received into the first cavity is gradually propelled into the hood through a valvular aperture, where it is eompacted into small balls, whieh, while the animal reposes at its ease, are returned seriatim to the mouth, to be remasticated by a voluntary effort. The aliment, when suffieiently remastieated, is again swallowed, and passes at once into the third, or plieated, compartment, by means of a peculiar mechanism, where it is compressed into flattened portions, which are gradually transmitted through a valvular orifice into the fourth compartment, or *abomasus*, the true digestive cavity.

The inner membrane of this portion secretes a fluid (the gastric juiee) well known for its power of eoagulating milk ; taken from the ealf, salted and dried, it is known under the name of rennet, and used in making eheese.

In young Ruminants, while their food is merely the mother's milk, the process of rumination is not carried on ; and the proportion which the different eompartments of the stomach bear to eaeh other is very different from that presented afterwards, when their aliment is changed from milk to herbage. The huge paunch, for instanee, is less than the *abomasus*, or fourth stomach, this being as yet the largest of the compartments, and the milk as it is swallowed passes at once into it, where it beeomes eurdled and then digested. In the camel, besides the almost total absence of the third stomaeh, or *omasus*, there is another peculiarity to be notieed, viz. an arrangement of deep eells in the paunch for the reeeption and preservation of water, and the enlargement of the cells of the *reticulum* for the same purpose. The paunch is divided into two portions, a right and a left, by a longitudinal ridge of muscular fibres: in the left is a series of deep eells capable altogether of containing from four to five quarts of water ; in the right is a smaller series eapable of containing about a quart. When these eells are filled, the fluid is kept free from mixture with the food by the contraetion of the orifiee of eaeh cell, and it can be foreed out at pleasure by the aetion of a museular expansion eovering the bottom of this cellular apparatus. The deep cells of the *reticulum* are arranged in twelve

rows, and are formed by muscular bands, intersecting each other transversely. This compartment in the camel appears to be destined exclusively as a reservoir for water, never receiving solid food, as in the ox or sheep; and it would seem that the remasticated food passes into the third small cavity, being conducted along the upper margin of the second, through a canal formed by a muscular ridge, which contracts with so much force as not only to open the orifice of the second cavity, but so as to bring forward the mouth of the third into the second, by which action the muscular ridges that separate the rows of cells are brought close together, so as to exclude these cavities from the canal through which the water passes. Sir E. Home observes, that, "while the camel is drinking, the action of the muscular band opens the orifice of the second cavity; at the same time it directs the water into it: and when the cells of that cavity are full, the rest runs off into the cellular structure of the first cavity. It would appear that camels, when accustomed to journeys in which they are kept for an unusual number of days without water, acquire the power of dilating the cells, so as to make them contain a more than ordinary supply for their journey; at least such is the account given by those who have been in Egypt." The llama resembles the camel in the arrangement of a cellular apparatus in the stomach. Fig. 5 represents a portion of the cellular apparatus of the camel's stomach, one-ninth of the natural size.

The Ruminantia are dispersed throughout the globe from the equator to regions within the arctic circle; but are most numerous in the warmer latitudes. The universality of the distribution of these animals is essentially connected with the welfare of our race, for not only is the flesh of most species acceptable as food, but that of some is in the highest estimation: nor is this all—their hair or wool, their skin, their hoofs, their horns, their antlers, nay, their bones, and even their intestines, are converted to our benefit. It is from this order that man has derived the most valuable of his domestic animals, which have spread with him as he has spread, becoming, like himself, denizens of the globe. Such is the case with the

ox, the sheep, and the goat. Domesticated from the earliest period, they have ever formed a main part of the national wealth of civilized kingdoms in all ages, and are intimately connected with the prosperity of our race. All the Ruminants, however, which man has domesticated are not universally spread; some few are adapted by their constitution to certain localities, beyond the bounds of which their value becomes diminished. They are formed for the places they tenant, and are there of the highest importance. Of these, one is the reindeer, an animal essential to the comforts if not the existence of the simple inhabitants of Lapland's ice-bound realm, where the ox and the sheep cannot exist. There "the reindeer form their riches." And again, who has not heard of the ship of the desert, the camel, which now, as in ancient days, freighted with merchandise, traverses the burning desert patient of thirst and hunger? To this animal let us first direct our attention.

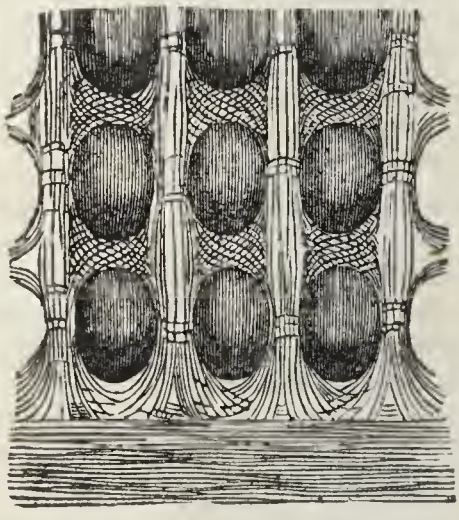


Fig. 5.

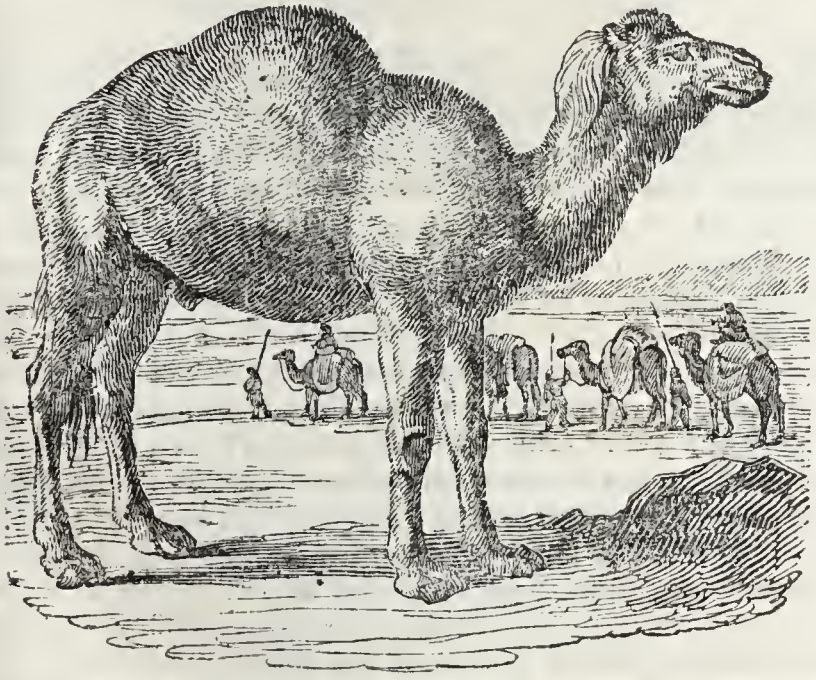
The Camel

(*Camelus dromedarius;* Gamal of the Hebrews; Djemel of the Arabs).

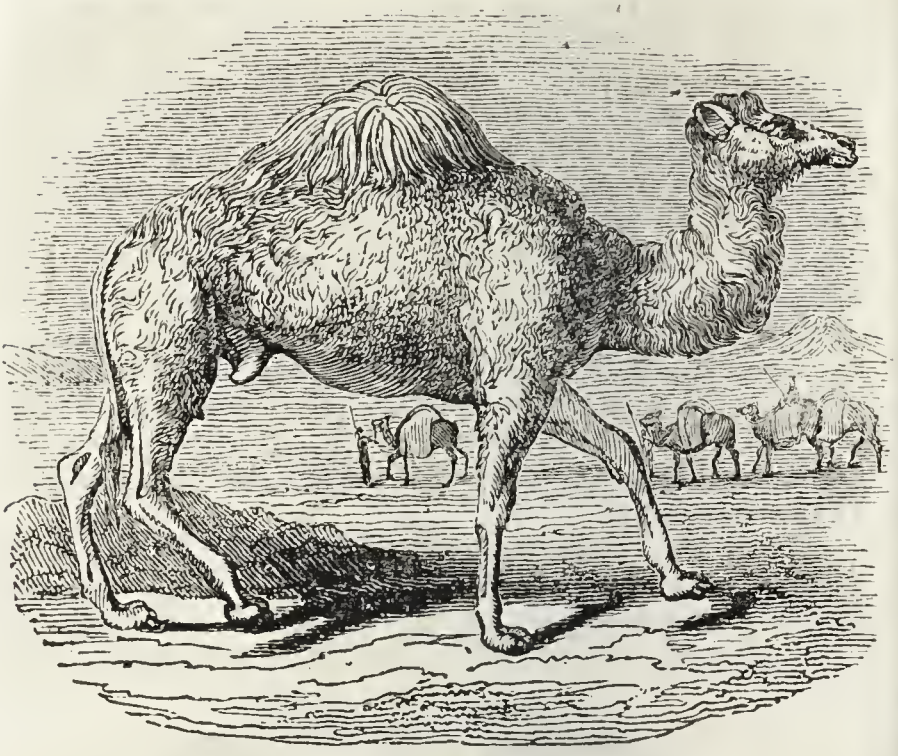
There is something strange and imposing in the aspect of the gaunt and angular camel, destitute, as it con-

fessedly is, of grace and animation. We are amazed at its height, its uncouth proportions, its long thin neck, its meagre limbs, and the huge hump on its back, which conveys the idea of distortion. Quietly it stands in one fixed attitude, its long-lashed eyelids drooping over the large dark eyes: it moves—and onward stalks with slow and measured steps, as if exercise were painful. To complete the picture, it is covered with shaggy hair, irregularly disposed, here forming tangled masses, there almost wanting. Its thick mobile upper lip is deeply divided; its feet are large and spreading, the toes being merely tipped with little hoofs. There are two species of this animal, the Bactrian and the Arabian. It is to the latter that we shall first direct our observation. (Figs. 6 and 7.)

The Arabian camel is distinguished from the Bactrian by having only one large fatty hump upon the back, and in being of a somewhat slighter make. It is not known in a wild condition, but most probably was indigenous in



6.—Camel.



7.—Swift Camel.

Arabia and the adjacent regions, the whole of its structure proclaiming the desert as its destined abode. Reclaimed from the earliest state, its history is interwoven with that of the patriarchs of old: time immemorial it has been the bondslave of man; and under his mastership is spread over the whole of northern Africa as far as Nubia, and from Syria, throughout Arabia, Persia, and India, being valued in all these regions as a beast of burden. In central Asia the Bactrian camel takes its place, but it is inferior in those qualities which render the Arabian species so eminently adapted to the arid burning desert over which it moves silently along, heavily loaded, patient of thirst and hunger, thus maintaining an intercourse between districts separated by vast plains of sand, a barrier more effectual than that of the rolling ocean. It is the unwearied patience, the strength, the docility, the power of maintaining long journeys on scanty fare,

that render the camel in its own country of intrinsic importance. By its means the merchant transports his merchandise from Aleppo or Bagdad to Meeca or Bassorah. Long strings of camels, or caravans as they are called, venture across the desert, each animal bearing a load of five hundred or even six hundred pounds weight, and the procession moves at the rate of nearly three miles an hour, regular as clock-work, day after day for eight hours daily. A caravan of camels thus wending their way over the plain, their footsteps falling noiselessly, so that the ear cannot catch the sound of their approach, whether on hard ground or sand, strongly impresses those who for the first time witness this truly eastern spectacle, which indeed calls to mind the days when "a company of Ishmaelites came from Gilead with their camels, bearing spicery, and balm, and myrrh, going to carry it down to Egypt." (Fig. 8.)

8.—Caravan in the Desert.

The more prominent of the structural peculiarities of the camel may here be briefly noticed. The camel treads flat on his toes, and not, as the ox, on a thick hoofed termination: we have already stated that they are cushioned beneath with large spreading callous elastic pads, connecting them together, and extending laterally beyond them, the horn-covered tips being alone free and separate (see Fig. 3—the Camel's Foot with the skin removed). This cushion expands by pressure at each step, a provision of evident advantage to the animal in passing over a sandy, yielding surface, while on hard or stony ground the elasticity of the pad gives ease to its

movements. The camel kneels down to be loaded (Fig. 9), and kneeling is its natural state of repose, and hence it is provided with certain callosities upon which to throw the weight of the body, both in kneeling down and rising up. The largest of these callosities occupies the chest, which is always brought to the ground; one is placed on each elbow and knee of the fore-limbs, one on the front of each knee of the hind-limbs, and a very small one on the outer side of each hock. These natural cushions are not produced by the habit of kneeling, as some have been ready to suspect, for the young camel is born with them already formed, and it may be observed that a similar callous pad is spread on the breast of the ostrich, which dwells in the desert, and reclines upon its chest. The camel is essentially the inhabitant of a flat expanse of country, beneath a burning sky. Elevated as it carries its head, it can discern the green oasis in the sea of sand at a vast distance; and so acute is its sense of smell, that it can scent the far-distant water. To shield the large eyeball from the glare of light, a beetling brow overarches it, and long lashes fringe the upper lid. Incessantly exposed to clouds of suffocating dust, the camel has its nostrils so constructed as to exclude, as much as

9.—Loading the Camel.

possible, the particles of sand driven by the wind; they are in the form of slits, converging towards each other, with elevated margins, the upper of which is capable of being shut down like the lid of a box, so as to close the aperture, or keep it open to any degree, at pleasure.

Hard and scanty is the desert fare upon which this animal subsists; but the fertile meads and flowery vales of our climate would afford it no temptation. Thorny shrubs, date-leaves, and the leaves and branches of the tamarisk, are its staple diet; and dates, beans, the hard kernels of which it crushes to powder, with cakes of barley, provided by its master, suffice to refresh it on its wearisome pilgrimage. Hence we see the necessity of its strong incisors, canine teeth, and canine-like molars, which enable it to browse on the coarsest shrubs with ease, and sever branches of considerable thickness. With its powerful, cleft, prehensile lip it draws the twigs or leaves to its mouth, or even nips off the tender shoots, or holds the tuft of herbage as it is gradually undergoing mastication. Hard and scanty, we have said, is the desert fare of the camel, but oftentimes the supply fails for days, or is to be obtained only in small quantities, and the travel-worn beast is put upon short allowance; then it is that we recognise the utility of that hump, which seemed at first a deformity. The fatty mass is gradually absorbed into the system, which thus receives nutriment; for the hump is a magazine against a time of want, to which the system has recourse when other supplies are inadequate.

It is a saying of the Arabs that the camel feeds on its own hump, and in a certain sense they are correct. After the wasting of this fatty mass, as described, three or four months of repose and copious nourishment are required to restore it to its usual condition, and this does not take place till the other parts are well replenished. When an Arab is about to commence a journey, the first thing about which he is solicitous is the state of his camel's hump.

We have already alluded to the cellular apparatus in the camel's stomach. At all times patient of thirst, with

this provision the camel can endure it for several days, subsisting on what is reserved in the cells ; and sometimes, it is said, driven by necessity, the driver sacrifices his camel in order to obtain the water, and prolong, perhaps preserve, his existence. This may have happened, but the statement rests on insufficient authority.

10.—Head of Camel, with Bells.

From the data collected by Burckhardt there appears be a great difference among different breeds of camels respects the power of enduring thirst, according to the mode of life to which they have been inured. Thus the camels of Anatolia require water every second day during a summer's journey ; but the camels of Arabia can dispense with it until the fourth, or even the fifth. In spring, when the young herbage is succulent, the camel

scarcely requires to drink, and the journey across the great Syrian desert, from Damascus to Bagdad, twenty-five days, may be then performed without any water being needed by or given to the camels.

The senses of sight, hearing, and smell are exquisitely acute in the camel : it is said to delight in the jingle of the bells hung about its neck, for it is often thus ornamented, as in ancient days, and as pack-horses formerly were in England, perhaps in order that stragglers may be enabled to rejoin the caravan. (Fig. 10.) Shells called cowries, and even ornaments of silver, are also added: the shells are strung in a semicircular form; hence the phrase, "ornaments like the moon."

11.—Halt of Camels.

During a journey it is customary to halt about four o'clock, to remove the loads and permit the camels to feed. (Fig. 11.) If the Arabs are desirous of preventing them from straying too far, they tie their fore-legs together, or bind the fetlock to the upper joint by a cord. Towards evening they are called in for their evening meal, and placed in a kneeling posture round the baggage. They do not browse after dark, and seldom attempt to

rise, but continue the process of rumination for the greater portion of the night.

The halts of the caravan for the night are exceedingly curious and picturesque. The following is Mr. Mac Farlane's description of a halt:—

"On their journeys, the devidjis always choose, for halting-places, spots that abound in bushes or brakes, where such are to be found; the camels are left at liberty to browse, and their drivers smoke their pipes or go to sleep. There is no danger of the camels escaping or wandering to any distance; they keep close to the spot where they are set at liberty, and can be rallied and formed in a line in a moment. I have more than once seen this done by the mere voice. When they rest for

12.—Halt of Camels.

the night, they generally kneel down in a circle—it is rarely considered necessary to tie one of their fore-legs at the bend of the knee. They always repose on their knees; and a curious thing in relation to their natural habits is, that I never saw one of them throw himself, *even for a moment*, on his side. (Fig. 12.) During the night's rest the devidjis generally sleep in the midst of the circle formed by the recumbent camels; if it be a *rainy* winter night they will pitch a little tent, but (I speak of Asia Minor) in this genial climate they nearly always repose like their quiet beasts, *à la belle étoile*. I once invaded a primitive dormitory of this sort in a curious

manner. It was at Boudja, a village (a few miles from Smyrna) where many of the Franks have their country-houses. I was hurrying home on a very dark night: at the entrance of the village, and in the shadow of a garden wall, I stumbled over something, which proved to be a young camel (they accompany their dams on their journeys almost as soon as they are born); and going forward I stumbled again over a sack, and fell headlong through an opening of the 'domestic circle' into the midst of it, and upon the sleeping *devidjis*. I suppose they were surprised at the intrusion, but both men and beasts were very civil—the latter, indeed, never moved, and seemed as passive as if I had been falling over roots of trees."

Camels are formed by nature to endure great variations of temperature. The winds of the desert are sometimes exceedingly keen: and even in Asia Minor, the winter cold is occasionally very severe. We add one more quotation from Mr. Mac Farlane.

"The winter of 1827-8 was the coldest that had been known for many years in Asia Minor: yet, on the coldest days, when I, though a native of the north, have been shivering and suffering, I have often seen the camels, at nightfall, *bivouacking* near Smyrna, on the banks of the Meles (Homer's river—as insignificant as is, or *was*, Fleet-ditch in summer, but a broad, brawling stream in winter), there to pass the inclement night in the open air. Their own instinct teaches them to contract their circle and kneel close together, and their masters merely cover their loins with a material as primitive as their modes of life and encamping. It is a coarse thick sort of cloth, always dyed red, made of camel's wool, mixed with sheep's wool and goats' hair."

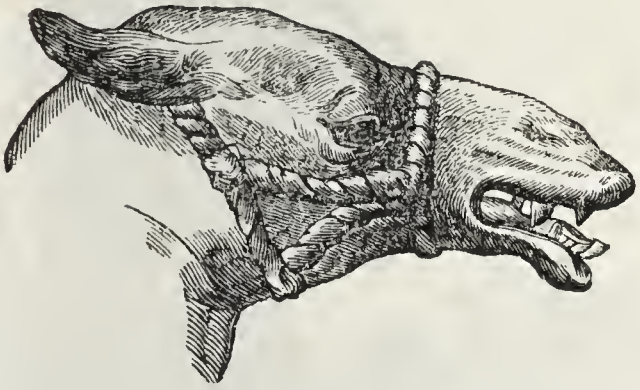
Amongst themselves they are sometimes very quarrelsome, and, after the hardest day's journey, no sooner is the baggage removed than they begin to fight, and are prone to give each other the most savage bites, and are not to be separated without danger. (Fig. 13.) One of the favourite amusements of the Turks of Asia Minor is camel-fighting: each being previously muzzled, they

13.—Camels fighting.

strike each other's heads, twist their neck, wrestle with their fore-legs, each endeavouring to throw the other to the ground. Crowds attend to witness the spectacle, and, as at the disgraceful dog-fights of our country, the Turks will clap their hands, encourage their respective favourites, and bet upon their success. The Pasha of Smyrna used frequently to regale the people with these games in an enclosed square before his palace. It is, however, only at particular seasons that the temper of the animal is thus excited, and that these combats take place.

The camel is often excessively loaded, and sometimes, inhumanly, the load is laid on sores or wounds; yet even then the animal neither refuses to rise nor attempts to cast it off: when suffering and irritated, however, he cries out, but his complaint is only of injustice, and then it must be extreme for him to complain at all. Fig. 14 is a delineation of the head of an ill-used camel uttering

its cry of distress. When a camel, loaded or unloaded, fails, from hunger and excessive fatigue, and sinks down, it seldom gets on its legs again, and is left to perish. Wellsted tells us that he often passed them when thus abandoned, and remarked the mournful looks with which they gazed on the receding caravan. When the Arab is upbraided with inhumanity, because he does not at once put a period to the animal's sufferings, he answers that the law forbids the taking away of life save for food,



14.—Camel uttering its cry.

and even then pardon is to be asked for the necessity which compels the act. When death approaches the poor solitary beast, vultures collect around, and, eager for food, commence their repast even before life is extinct. The traveller continually sees remains of this faithful servant of man, exhibiting sometimes the perfect skeleton covered with a shrunk, shrivelled hide, sometimes the bones only, deprived of flesh, and bleached to dazzling whiteness by the scorching rays of a desert sun.

The Arabian or one-humped camel is usually called, by way of distinction, the Dromedary, but erroneously.

The dromedary is a light variety of this species, and is termed Maherry or el Heirie in the Arabian desert, and Sabayee in the north of Africa. It is used principally for journeys of despatch, carrying a single rider, or but a very light burden; and it will perform very long

15.—Mounted Camels.

journeys in an almost incredible space of time. "When thou shalt meet a heirie, and say to the rider, 'Peace be between us,' ere he shall have answered, 'There is peace between us,' he will be far off, for his swiftness is like the wind," is an Arabian figure to illustrate the fleetness of this saddle-dromedary. This fleetness is however much overrated, and it is less by positive speed than by extraordinary powers of sustained exertion, day after day, through a time and space which would ruin any other quadruped, that it accomplishes such surprising journeys. Urged to a gallop, it cannot maintain its pace for half an hour, and is easily distanced by the horse: but it can sustain a forced trot for several hours together; Wellsted says for twenty-four consecutive hours, at the rate of from six to eight miles an hour. A gentle and easy amble of five or five and a half miles an hour is however the favourite quick pace of the dromedary, and, if allowed to persevere in it, the animal will carry its rider an uninterrupted journey of several days and nights. (Fig. 15.) A common caravan journey of twenty-five days is sometimes performed in five days at this rate. This swift breed is of great antiquity, and is referred to in several places in the Scriptures. The camels of Oman are the fleetest, the most beautiful, and the most highly prized. (Fig. 16.) It would appear that there is also a swift breed of the Bactrian or two-humped camel, which is in request in China.

The rate of travelling long journeys performed by the heavy caravan, each camel carrying from five hundred to eight hundred pounds weight, does not exceed two miles and a half or two miles and three-quarters an hour. This, however, can be maintained for fifty days in succession, and for eight hours each day; but a more lightly loaded caravan will not only travel quicker, but continue the march for nine or ten hours daily. In 1751 Mr. Carmichael traversed the great desert from Aleppo to Bassorah, his course being seven hundred and ninety-seven miles, with a caravan of heavily loaded camels, and was three hundred and twenty-two hours on the road. In 1781 Mr. Irwin travelled over the little desert from

16.—Swift Camel.

Aleppo to Bagdad, his route being four hundred and eighty miles, in one hundred and ninety-three hours and a half.

The soil best adapted to the camel's foot is a dry and hard but fine and gravelly plain; where the sand is deep and soft, the loaded animal sinks at every step and becomes rapidly exhausted. It can also ascend steep and

17.—Oriental Pilgrimage.

rugged mountain-paths with considerable ease, but, as Belzoni once experienced to his cost, sometimes slips and rolls down.

Besides the commercial caravans which traverse the desert, there are also caravans of pilgrims to Mecca, enjoined by the Mohammedan religion. (Fig. 17.) At Mecca meet the Mohammedans from Abyssinia to India. It appears, according to Burckhardt, that the pilgrimage from Damascus to Mecca with the Syrian caravan cannot now be performed in the most humble way under a cost of 125*l.* sterling; and yet there are from five to seven great caravans which regularly arrive at Mecca after the feast of Bairam, which follows the Ramadhan. To have visited the tomb of Mohammed, which entitles the pilgrim to the proud distinction of being a hadji, is an honour to which the meanest devotee aspires; and thus it is that within the walls of Mecca are annually assembled vast bodies of Asiatics and Africans, who have toiled thither, sustaining every privation and misery, and of whom many, worn out with fatigue, never return to claim the rewards of their enthusiasm. In these extraordinary journeys the camel sustains an important part, and indeed, without the services of these animals—some bearing water in skins, some the merchandise of distant lands, some the food and necessaries of the pilgrims and their own provender, and others the devotees—the pilgrimage could not be accomplished.

Mr. Parsons, who saw the pilgrim caravan set out from Cairo about forty years ago, has given a programme of the procession, drawn up with all the precision of a herald, and which occupies ten pages of his quarto work. The cavalcade was six hours in passing him. The most striking appearance to a European must have been the camels, in every variety of splendid trappings, laden with men or women, provisions, clothes, and cooking apparatus, and water-skins, and tents, and artillery, and holy sheiks, and Mamelukes. (Fig. 18.) There were camels "with two brass field-pieces each" —others "with bells and streamers"—others "with

18.—Mounted Camels.

men beating kettle-drums"—others "covered with purple velvet"—others "with men walking by their sides, playing on flutes and flageolets"—others "handsomely ornamented about their necks, their bridles being studded with silver, intermixed with glass beads of all colours, and ostrich-feathers on their foreheads"—and, last of all, "the sacred camel, an extraordinary large camel, with a fine bridle studded with jewels and gold, and led by two holy sheiks, in green, a square house or chapel on his back." In addition to these camel splendours there were horses with every variety of caparison; Mamelukes, and pikemen, and janissaries, and agas, and the emir Hadji (commander of the pilgrimage) in robes of satin—to say nothing of numberless "buffoons playing many pranks." Mr. Parsons sums up the splendour of this pilgrim caravan by declaring that "it is by much the grander exhibition than the spectacle of the Lord Mayor and Aldermen going in procession through the City of London;"—but this may be doubted by some as the exaggeration of a traveller, while others may deem it impossible.

Differing from the usual practice of commercial caravans, the pilgrimage is performed chiefly by night. The caravan generally moves about four o'clock in the afternoon, and travels without stopping till an hour or two after sunrise. A large supply of torches is carried from Cairo, to be lighted during the hours of darkness. The Bedouins, who convey provisions for the troops, travel by day only, and in advance of the caravan. The watering-places on the route are regularly established. Each is supplied with a large tank, and protected by soldiers who reside in a castle by the well throughout the year. On parts of the route the wells are frequent and the water good; but on others, three days of the journey frequently intervene between one watering-place and another—and the fountain is often brackish. Fig. 19 is an illustration of another method where camels are watering at a reservoir, called birket, which is supplied by an aqueduct, and at which caravans are accustomed to halt. When the Cairo caravan is completely assem-

bled, and the formalities which we have just described are gone through, the great body of travellers begin to move, the stations of the different parties of hadjis, according to their provinces and towns, being appointed, and rigidly observed throughout the mareh. This order is determined by the geographical proximity of the place from which eaeh party comes. At Adjeroud, where the Egyptian earavan halts on the second day's march, it is supplied with water from Suez; and here it reposes a day and a night, to prepare for a forced march of three days and two nights, through a region where there is no water, the desert of El Tyh, whieh nearly extends from

19.—Camels watering.

the head of one gulf of the Red Sea to the other—that is, from Suez to Akaba. The Hadj route is eireuitous. It is here that the privations both of men and quadrupeds commence. The splendid trappings of the camels, their velvets and their bells, have lost their attraetion; but their power of enduranee beeomes the safety of the pilgrims—while the richly-caparisoned horse, impatient of thirst, and more easily subdued by fatigue, is more frequently a burthen to the caravan than an advantage. We may add here that the horse, until he is aceustomed to the sight of the eamel, is apt to be startled at its

20.—Camel and Horse.

appearance, of which Fig. 20 is a representation. The route of the Egyptian caravan, after it passes Akaba, lies by the shores of the Red Sea for nearly six hundred miles; and, therefore, it cannot properly be said at any time after the first ten days' march to be upon the desert, as the Syrian caravan is for thirty days. But its difficulties are more numerous; and it has to pass regions quite as arid and inhospitable. Every part of Arabia is covered with sandy plains; and when the mountain steeps are crossed, the long extended valleys rarely offer water. The Arabic language is rich in words expressing every variety of desert, differing from each other by very slight shades of meaning: thus, they have terms descriptive of a plain—a plain in the mountain—a plain covered with herbs—a naked sandy desert—a stony desert—a desert with little spots of pasturage—a desert without water.* Although the caravan route from Cairo to Mecca presents, with the exception of the desert El Tyh, none of those enormous wastes, like the great Southern Desert of Arabia, "where the Arabs have only the sun and the

* See Humboldt's Voyage, tom. vi., Note to p. 7.

stars to direct their way;" nor is, like the Libyan desert, "a sea without waters, an earth without solidity, disdaining to hold a foot-print as a testimony of subjection,"* there are many tracts, as well as the desert from Suez to Akaba, in the forty days' journey, which offer to the pilgrim abundance of fatigue and suffering. If water fail, as it sometimes does, even at the wells in particularly dry seasons—if the water-skins evaporate more quickly than they ordinarily do—the camel's power of endurance is severely tried, for his wants are the last attended to. Happy are the pilgrims if the rain of the mountains have filled the banks of some little river. Even the much-enduring camels, at the sight of water, after many days' abstinence, break the halters by which they are led, and in rushing or stumbling down the banks throw off their loads, and occasion infinite disorder.† Mr. Buckingham has however described a scene in which the patience of the camel is contrasted in a remarkable way with the eagerness of the horse:—"It was near midnight when we reached a marshy ground, in which a clear stream was flowing along, through beds of tall and thick rushes, but so hidden by these, that the noise of its flow was heard long before the stream itself could be seen. From the length of the march, and the exhausting heat of the atmosphere, even at night, the horses were exceedingly thirsty: their impatient restlessness, evinced by their tramping, neighing, and eager impatience to rush all to one particular point, gave us indeed the first indications of our approach to water, which was perceptible to their stronger scent long before it was even heard by us. On reaching the brink of this stream, for which purpose we had been forcibly turned aside, by the ungovernable fury of the animals, to the southward of our route, the banks were found to be so high above the surface of the water, that the horses could not reach it to drink. Some, more impatient than the rest, plunged themselves and their riders at once into the current; and, after being led swimming to a less

* Purchas. † Burckhardt's Nubia, p. 368.

elevated part of the bank over which they could mount, were extricated with considerable difficulty; while two of the horses of the caravan, who were more heavily laden than the others, by carrying the baggage as well as the persons of their riders, were drowned. The stream was narrow, but deep, and had a soft muddy bottom, in which another of the horses became so fastly stuck, that he was suffocated in a few minutes. The camels marched patiently along the edge of the bank, as well as those persons of the caravan who were provided with skins and other vessels containing small supplies of water; but the horses could not, by all the power of their riders, be kept from the stream, any more than the crowd of thirsty pilgrims, who, many of them having no small vessels to dip up the water from the brook, followed the example of the impatient horses, and plunged at once into the current. . . . This scene—which, amidst the obscurity of the night, the cries of the animals, the shouting and quarrelling of the people, and the indistinct and perhaps exaggerated apprehensions of danger from a totally unexpected cause, had assumed an almost awful character—lasted for upwards of an hour."*

Fig. 21 represents this scene with considerable spirit.

Of the sufferings endured on some occasions, particularly by the smaller caravans, Burckhardt relates an interesting story that happened in the Nubian desert, which beautifully illustrates the surprising instinct of the camel. It was told to him by a man who had himself suffered all the pangs of death:—

"In the month of August a small caravan prepared to set out from Berber to Daraou. They consisted of five merchants and about thirty slaves, with a proportionate number of camels. Afraid of the robber Naym, who at that time was in the habit of waylaying travellers about the well of Nedjeym, and who had constant intelligence of the departure of every caravan from Berber, they determined to take a more eastern road, by the well Owareyk. They had hired an Ababde guide, who

* Buckingham's Mesopotamia.

21.—Camels watering.

conducted them in safety to that place, but who lost his way from thence northward, the route being very unfrequented. After five days' march in the mountains their stock of water was exhausted, nor did they know where they were. They resolved, therefore, to direct their course towards the setting sun, hoping thus to reach the Nile. After two days' thirst, fifteen slaves and one of the merchants died; another of them, an Ababde, who had ten camels with him, thinking that the camels might know better than their masters where water was to be found, desired his comrades to tie him fast upon the saddle of his strongest camel, that he might not fall down from weakness; and thus he parted from them, permitting his camels to take their own way: but neither the man nor his camel were ever heard of afterwards. On the eighth day after leaving Owareyk, the survivors came in sight of the mountains of Shigre, which they immediately recognised; but their strength was quite exhausted, and neither men nor beasts were able to move any farther. Lying down under a rock they sent two of their servants, with the two strongest remaining camels, in search of water. Before these two men could reach the mountain, one of them dropped off his camel deprived of speech, and able only to move his hands to his comrade as a signal that he desired to be left to his fate. The survivor then continued his route; but such was the effect of thirst upon him that his eyes grew dim, and he lost the road, though he had often travelled over it before, and had been perfectly acquainted with it. Having wandered about for a long time, he alighted under the shade of a tree, and tied the camel to one of its branches; the beast, however, smelt the water (as the Arabs express it), and, wearied as it was, broke its halter, and set off galloping furiously in the direction of the spring, which, as it afterwards appeared, was at half an hour's distance. The man, well understanding the camel's action, endeavoured to follow its footsteps, but could only move a few yards; he fell exhausted on the ground, and was about to breathe his last, when Providence led that way, from a neighbouring encampment,

a Bisharye Bedouin, who, by throwing water upon the man's face, restored him to his senses. They then went hastily together to the water, filled the skins, and, returning to the caravan, had the good fortune to find the sufferers still alive. The Bisharye received a slave for his trouble. My informer, a native of Yembo, in Arabia, was the man whose camel discovered the spring; and he added the remarkable circumstance, that the youngest slaves bore the thirst better than the rest, and that, while the grown-up boys all died, the children reached Egypt in safety."

The phenomenon of the *mirage* excites in the pilgrim of the deserts those alternations of hope and disappointment which add to the miseries of his actual situation. He sees before him lakes of water, which are gone the instant he arrives at the spot where he fancied they offered their refreshment to his feverish lips. The Arabs are familiar with this remarkable appearance, and they are seldom deceived by it; although, if the mirage and a real stream could be seen at the same time, it would be difficult to distinguish the reality from the delusion.* The guides of the European traveller often amuse themselves by calling to him that water is in sight, when they are upon the most thirsty spots of a sandy or gravelly plain. Burckhardt has described the mirage with his usual felicity:†—"During the whole day's march we were surrounded on all sides by lakes of mirage, called by the Arabs serab. Its colour was of the purest azure, and so clear that the shadows of the mountains which bordered the horizon were reflected in it with the greatest precision, and the delusion of its being a sheet of water was thus rendered still more perfect. I had often seen the mirage in Syria and Egypt, but always found it of a whitish colour, rather resembling a morning mist, seldom lying steady on the plain, but in continual vibration; but here it was very different, and had the most perfect resemblance to water. The great dryness of the air and earth in this desert may be the cause of the difference.

* Lyon, p. 347. † Nubia, p. 193.

The appearance of water approached also much nearer than in Syria and Egypt, being often not more than two hundred paces from us, whereas I had never seen it before at a distance of less than half a mile. There were at one time about a dozen of these false lakes around us, each separated from the other, and for the most part in the low grounds." The mirage is caused by the extraordinary refraction which the rays of the sun undergo in passing through masses of air in contact with a surface greatly heated. These atmospheric delusions are not confined to the appearance of water in the desert. The traveller fainting beneath a burning sun sees a tree in the distance, sufficiently large for him to find a shade beneath its boughs. He quickens his pace, hoping to enjoy half an hour of refreshing coolness before his camels shall have passed. The tree is really a miserable shrub, that does not afford shade enough to shelter one of his hands. This magnifying of objects is produced by the slight vapour which rises when the heat is greatest. When the sun gleams on the sand-hills, they appear at an immense distance; the traveller hopes that his camels may be spared the pain of crossing these slippery ascents,—when in a few minutes he is close upon them, and sees a man or a camel, within a stone's throw, toiling to the top.* As the sun ascends towards the zenith, and the earth and the currents of air assume different temperatures, the phenomena of the mirage present numerous modifications. Humboldt states that in the plains of South America, where the air is very dry, he often saw the images of troops of wild oxen, suspended in the air, long before the eye could see the oxen themselves; and the small currents of air were of such a variable temperature, that the legs of some appeared to rest upon the ground, while others were elevated above it. In Arabia, Niebuhr observed the image of an animal reversed, before he saw the direct image. Sometimes towers and large masses of apparent buildings are seen upon the horizon, which disappear at intervals, without

* See Lyon, p. 347.

the traveller being able to decide upon the true forms of the objects, which are probably little sand-hills, beyond the ordinary range of vision.* All these phenomena are modifications of the mirage, though the name is generally applied to the unreal lakes of the desert. The Persian and Arabian poets make frequent allusion to these magical effects of terrestrial refraction.

Such delusive appearances must have a tendency to fill the mind of the inexperienced traveller with a vague and somewhat awful wonder. Upon a sandy surface, too, the stillness of the desert is particularly impressive. Passing over such a soil the camel's tread produces scarcely any sound. Capt. Lyon says, "I have sometimes walked at night from the kafflé" (caravan), "and have experienced a sensation I am unable to describe, as I felt the wind blow past me, and heard the sound which my figure caused me to make by arresting its progress." It is at such moments that the European traveller may think of the solemn denunciation of the prophet against Babylon; and may fancy, for a while, that he is the only tenant of the sandy wastes: "The sea is come up upon Babylon, she is covered with the multitude of the waves thereof: her cities are a desolation, a dry land, and a wilderness, a land wherein no man dwelleth, neither doth any son of man pass thereby."†—Of the tediousness of a journey through these arid regions there can be no doubt; and Mr. Buckingham seems to have felt the full force of its monotony: "In walking my horse a gentle pace, if I mounted the last in the caravan, I could gain the head of it in two hours, though our line extended nearly two miles in length; when, as was the practice of most of the other horsemen of the party, we dismounted on the grass, suffered our horses to feed there, and either lay down or smoked a pipe for nearly an hour, until the caravan had all passed us again. This was repeated at every similar interval; so that, in an uninteresting part of the country, where there was no pic-

* Humboldt's Voyages, liv. vi. chap. xvii.
† Jeremiah.

turesque landscape to charm the sight, not a tree to relieve the monotonous outline of the hills, nor sufficient verdure to clothe their rocky sides—where either we were lighted only by the stars, or scorched by the sun an hour after its rising—its tediousness may be easily conceived." And yet even the desert has its pleasures, —when the caravan reaches some wished-for fountain, and finds a patch of verdure, or a few shrubs, after many hours of privation. Major Denham has prettily described a scene of this nature:—"The day had been oppressively hot, my companions were sick and fatigued, and we dreaded the want of water. A fine dust, arising from a light clayey and sandy soil, had also increased our sufferings: the exclamations of the Arab who first discovered the wells were indeed music to our ears; and after satisfying my own thirst, with that of my weary animals, I laid me down by one of the distant wells, far from my companions; and these moments of tranquillity, the freshness of the air, with the melody of the hundred songsters that were perched amongst the creeping plants, whose flowers threw an aromatic odour all around, were a relief scarcely to be described." The happiness of such a contrast must naturally be great; and so many writers have described this pleasure, that the idea has passed from the poetical into the popular language even of the west—and thus the recollection of an interval of joy, amidst a life of suffering—

"The greenest spot
In memory's waste"—

is the oasis in the desert.

And yet to an imaginative mind, stored with knowledge, and ardent in the pursuit of new objects of research, even the dreariest wilds of the desert have their charm. Burckhardt, according to Captain Beechey, "has frequently been heard to declare that his most pleasant hours in travelling had been passed in the desert;" and Captain Beechey, himself an adventurous traveller, has well explained this:—"If the desert have terrors peculiar to itself, it has also its peculiar pleasures. There is

something imposing, we may say sublime, in the idea of unbounded space which it occasionally presents; and every trifling object which appears above its untenanted surface assumes an interest which we should not, on other occasions, attribute to objects of much greater importance. The little romance which its stillness and solitude encourage, is at the same time grateful to the feelings; and one may here dream delightfully of undisturbed tranquillity and independence, and of freedom from all the cares, the follies, and the vices of the world." A principal source of this calm of the mind, when surrounded by real hardships and cheerless solitudes, must spring from that feeling which is one of the most elevating of all the various trains of human thought,—the consciousness of an earnest determination to struggle with difficulties. Whether the privations of the uncivilized or the crosses of the social life are to be overcome, to meet the evil, whatever it be,—

> "Nor bate a jot
> Of heart or hope, but still bear up and steer
> Right onward;"—

this is in itself a triumph; and the world can give nothing better than those moments when a man feels that he has looked dangers and annoyances in the face, and that he shall surmount them.

The hot wind of the deserts has been described as producing the most fatal effects,—as suffocating men and beasts in an instant. This is one of the exaggerations which attach to such remarkable phenomena, they being generally described by persons who have only heard of their results. Burckhardt, who seldom relates anything but of his own knowledge, was very anxious to prove the truth of these relations; and, according to the accounts which he had from the Arabs, as well as from his own experience, the evil, though a serious one, is not so tremendous as travellers in general have pretended:—

"I again inquired, as I had often done before, whether my companions had often experienced the semoum (which we translate by the 'poisonous blast of

the desert,' but which is nothing more than a violent south-east wind). They answered in the affirmative, but none had ever known an instance of its having proved fatal. Its worst effect is, that it dries up the water in the skins, and so far it endangers the traveller's safety. In these southern countries, however, water-skins are made of very thick cow-leather, which are almost impenetrable to the semoum. In Arabia and Egypt, on the contrary, the skins of sheep or goats are used for this purpose; and I witnessed the effect of a semoum upon them, in going from Tor to Sucz overland, in June, 1815, when in one morning a third of the contents of a full water-skin was evaporated. I have repeatedly been exposed to the hot wind in the Syrian and Arabian deserts, in Upper Egypt and Nubia. The hottest and most violent I ever experienced was at Suakin; yet, even there, I felt no particular inconvenience from it, although exposed to all its fury in the open plain. For my own part, I am perfectly convinced that all the stories which travellers or the inhabitants of the towns of Egypt and Syria relate of the semoum of the desert are greatly exaggerated, and I never could hear of a single well-authenticated instance of its having proved mortal either to man or beast. The fact is, that the Bedouins, when questioned on the subject, often frighten the townspeople with tales of men, and even of whole caravans, having perished by the effects of the wind; when, upon closer inquiry, made by some person whom they find not ignorant of the desert, they will state the plain truth. I never observed that the semoum blows close to the ground, as commonly supposed, but always observed the whole atmosphere appear as if in a state of combustion: the dust and sand are carried high into the air, which assumes a reddish, or bluish, or yellowish tint, according to the nature and colour of the ground from which the dust arises. The yellow, however, always, more or less, predominates. In looking through a glass of a light yellow colour, one may form a pretty correct idea of the appearance of the air, as I observed it during a stormy semoum at Esne, in Upper Egypt, in May, 1813. The

semoum is not always accompanied by whirlwinds; in its less violent degree it will blow for hours with little force, although with oppressive heat; when the whirlwind raises the dust, it then increases several degrees in heat. In the semoum at Esne the thermometer mounted to 121° in the shade; but the air seldom remains longer than a quarter of an hour in that state, or longer than the whirlwind lasts. The most disagreeable effect of the semoum on man is, that it stops perspiration, dries up the palate, and produces great restlessness. I never saw any person lie down flat upon his face to escape its pernicious blast, as Bruce describes himself to have done in crossing this desert; but during the whirlwinds the Arabs often hide their faces with their cloaks, and kneel down near their camels, to prevent the sand or dust from hurting their eyes. Camels are always much distressed, not by the heat, but by the dust blowing into their large, prominent eyes: they turn round and endeavour to screen themselves by holding down their heads; but this I never saw them do except in case of a whirlwind, however intense the heat of the atmosphere might be. In June, 1813, going from Esne to Siout, a violent semoum overtook me upon the plain between Farshyout and Berdys; I was quite alone, mounted upon a light-footed hedjin. When the whirlwind arose, neither house nor tree was in sight; and while I was endeavouring to cover my face with my handkerchief, the beast was made unruly by the quantity of dust blown into its eyes and the terrible noise of the wind, and set off at a furious gallop; I lost the reins, and received a heavy fall, and, not being able to see ten yards before me, I remained wrapped up in my cloak on the spot where I fell until the wind abated; when, pursuing my dromedary, I found it at a great distance, quietly standing near a low shrub, the branches of which afforded some shelter to its eyes.

"Bruce has mentioned the moving pillars of sand in this desert, but, although none such occurred during my passage, I do not presume to question his veracity on this head. The Arabs told me that there are often

whirlwinds of sand, and I have repeatedly passed through districts of moving sands, which the slightest wind can raise; I remember to have seen columns of sand moving about like waterspouts in the desert, on the banks of the Euphrates, and have seen at Jaka terrible effects from a sudden wind; I therefore very easily credit their occasional appearance on the Nubian desert, although I doubt of their endangering the safety of travellers."

In a subsequent part of his travels in Nubia, the same accurate observer, to whom we are under so many obligations in this account of the camel, has described the most tremendous hurricane of the desert which he ever witnessed:—"A dark blue cloud first appeared, extending to about 25° above the horizon; as it approached nearer and increased in height, it assumed an ash-grey colour, with a tinge of yellow, striking every person in the caravan, who had not been accustomed to such phenomena, with amazement at its magnificent and terrific appearance. As the cloud approached still nearer, the yellow tinge became more general, while the horizon presented the brightest azure. At last, it burst upon us in its rapid course, and involved us in darkness and confusion: nothing could be distinguished at the distance of five or six feet: our eyes were filled with dust; our temporary sheds were blown down at the very first gust, and many of the more firmly fixed tents followed; the largest withstood for a time the force of the blast, but were at last obliged to yield, and the whole camp was levelled with the ground. In the mean time, the terrified camels arose, broke the cords by which they were fastened, and endeavoured to escape from the destruction which appeared to threaten them." Some writers state that camels, at the very first blast of the semoum, bury their noses in the sand.

Such are the dangers to which a caravan travelling through the deserts of Asia and Africa* is exposed,

* Humboldt has calculated, from maps constructed upon a large scale, that the great desert of Africa, without including Bornou and Darfour extends over 194,000 square

and, however splendidly appointed may be the caravans of the Hadj, they cannot escape these dangers, or materially diminish the privations of all those who pass over such dreary regions. It must be quite evident that, without the camel, the journey would be totally impossible. With this useful creature, whose value to the pilgrim is beyond all price, its difficulties are alleviated and its dangers averted; and if men can, in any degree, emulate the camel's endurance and abstinence, as the Arabs do by constant habit, there may be hunger, and thirst, and fatigue, but exhaustion and death will be battled with, and the weak, the faint of heart, and the luxurious only will fall in the struggle.

The camel is not only valuable as a beast of burden, its milk is in requisition: it is the milk used for ordinary purposes by the Arabs, that of goats and sheep being generally made into butter. The Arab feeds his colt with it, and even gives it to his mare. Flour made into a paste with sour camel's milk is a common dish among the Bedouins; it is called ayesh. Rice or flour boiled with sweet camel's milk is another: it is called behatta.

Though the flesh of the camel was among the meats prohibited to the Jews, it is not only eaten, but relished, by the Arabs: it is not often, however, that the Arab kills a camel in order to enjoy this luxury. When this does happen, the flesh is cut into large pieces: some part is boiled, and its grease mixed with borgoul (wheat boiled with some leaven and then dried in the sun); part is roasted, and, like the boiled, put upon the dish of borgoul. The whole tribe then partakes of the delicious feast. The grease of the camel is kept in goat-skins, and used like butter. The woolly hair of the camel, which towards the close of spring is loose and easily pulled away from the skin, is applied to various purposes and woven into coarse cloth used as tent-coverings. Even the dung of the camel is not neglected: it forms the chief material for fuel in Egypt, Arabia,

leagues. The immensity of this waste will be apparent, when it is considered that the Mediterranean sea only occupies 79,800 square leagues.

and Persia, and from the smoke, or rather soot, of this fuel is obtained sal-ammoniac, which was formerly procured almost exclusively from this source, and for the manufacturing of which there were, in 1720, laboratories at Cairo and other towns in Egypt.

At San Rossora the Tuscan government established a stud of camels for the purpose of carrying fagots, hay, straw, &c., from the domain of San Rossora to Pisa and other towns. It would appear that this establishment was founded about the middle of the seventeenth century, in the reign of the Grand-Duke Ferdinand de' Medici II. In 1789 it consisted of one hundred and ninety-six camels, male and female, and in 1810 of about one hundred and seventy, Of its actual state we have no recent authentic information.

M. Santi, professor of natural history at Pisa, published at Paris in 1811, in the 'Annales du Muséum d'Histoire Naturelle,' an interesting and scientific account of the natural history of the camel, as observed at Rossora. He says the female camel goes with young between eleven and twelve months, at the end of which time she has one foal. There has been no example at San Rossora of more than one being produced at a birth. The little one is at first unable to stand upon its legs; and, as the mother will not stoop so as to allow it to suck, it would perish with hunger if the keeper did not lift it up to receive the nourishment which nature has provided. This assistance is rendered to the helpless creature for five or six days, during which time it acquires strength to stand upon its legs. We can find no account of the camels of the East which mentions this circumstance: it may perhaps be an evidence of the degeneration of the species in Europe. It is probable, however, that the Arabs, who are distinguished for their extreme care of their camels and horses, may afford the same aid to the young, although the fact has not been noticed. In a wild state, it is evident that the dam must stoop, or the young camel stand up to suck; if otherwise, the race could not be continued.

During the winter the working camels of Pisa are fed

with hay, in large stables; but during the remainder of the year they are turned out to pasture with the rest, who remain without shelter during all seasons. The green and tender grass, which other cattle eat with so much avidity, is neglected by these camels; but they greedily devour the leaves of the oak, of the cork-oak, and of the alder, and feed with manifest delight on every hard and dry substance which they can find, such as the thorn, the thistle, and the broom. They drink only once a-day.

Of the mode of breaking and training the camel by the people of the East we have no complete account. M. Santi supplies this information, with regard to those of Tuscany. At the age of four years a camel which is intended for labour is broken in. The trainers first double up one of his fore legs, which they tie fast with a cord; they then pull the cord, and thus usually compel the animal to fall upon his bent knee. If this does not succeed, they tie up both legs, and he falls upon both knees, and upon the callosity which is upon his breast. They often accompany this operation with a particular cry, and with a slight blow of a whip. At this cry and blow, with the addition of a sudden jerk downwards of his halter, the camel gradually learns to lie down upon his belly, with his legs doubled under him, at the command of his driver. The trainers then accustom him to a pack-saddle, and place on it a load, at first light, but increased by degrees as the animal increases in docility; till at last, when he readily lies down at the voice of his driver and as readily rises up with his load, his education is so far complete. The burthen of a full-grown camel of Pisa is sometimes four hundred kilogrammes (above 800 lbs.); but such a load, if we may judge by other accounts, is excessive.

He is accustomed, in the same gradual manner, to allow his driver to mount, and to obey all his orders, and even his motions, in the direction of his course. M. Santi says that it is neither a tedious nor a difficult task thus to subdue an animal of a timid and gentle nature, without defence, and whose spirit has been broken by a long course

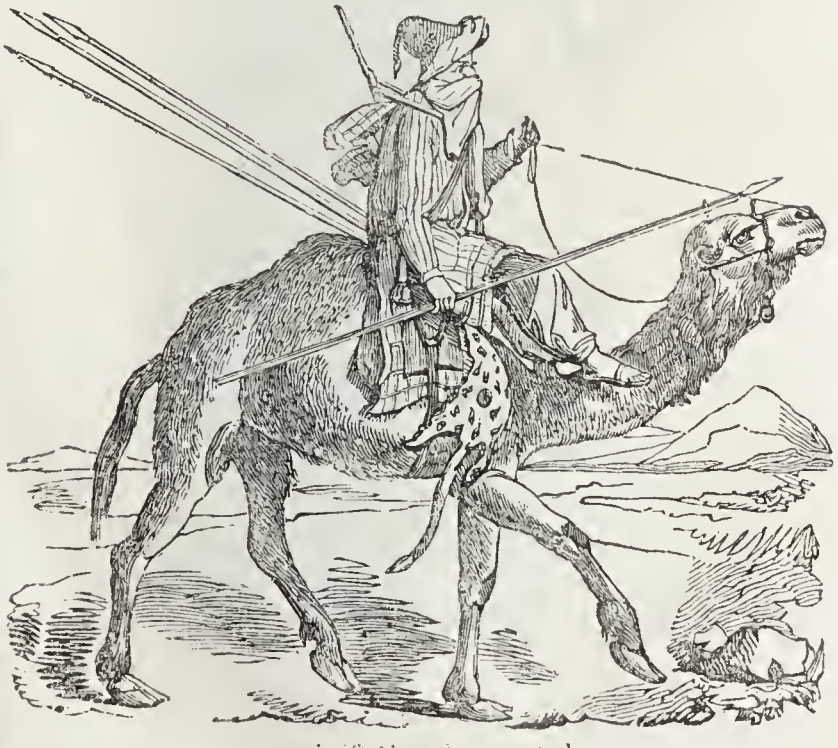
of slavery. The camels of Pisa, he adds, do not complain with their voices if too heavily laden; but it would appear that the experience and humanity of the Tuscan guides prevent the necessity for this complaint, as they know that the camel would not, or rather could not, rise, if thus over-burthened.

22.—Camel carrying a Bride.

The Moors introduced the camel into Spain, and after the conquest of Granada, and the expulsion of the Moorish inhabitants, many of these animals remained in the southern districts; but the race was not kept up, and therefore Spain, where in various localities the camel would be peculiarly serviceable, no longer possesses this useful animal. We learn that camels have been lately imported into South America from the Canary Islands with a probability of success.

The camel has bred in the gardens of the Zoological Society.

The colour of this animal, as of most domestic animals, is subject to variety. The brown colour appears not to be esteemed; reddish or light gray is preferred. Occasionally black camels are seen. In Egypt the average price of one of these beasts of burden is from thirty to fifty dollars; but the swift Oman camels, which are much valued, sell at a higher rate, and Burckhardt mentions an instance in which three hundred dollars were given for one. When travelling in Nubia, Burckhardt saw the camel almost in a wild state, whole herds being left to pasture unattended by men: they were kept for the sake of their flesh and milk, few being employed as beasts of burden; they even appeared frightened at the approach of men and loaded camels—a circumstance this traveller had never before witnessed. The Nubian camels are generally white.



Swift Camel, mounted.

24.—Malefactor paraded on Camel.

Many of our pictorial specimens of the camel are illustrative of scenes in its domestic life, and consequently of the manners of the people whose servant it is, and with whose history its own is intimately connected. Fig. 22,—Camel carrying a Bride. "One of the greatest solemnities of these simple Arab tribes is that of conducting a bride to her husband. The lady is placed in a frame on the back of a camel, and is housed over with carpets, shawls, and ostrich-feathers. The camel is led by a relation of the bride, preceded by dancing people, music, mounted and dismounted Arabs, who shout and fire their guns, running backward and forward in the procession. Captain Lyon made a drawing of the bridal camel and his trappings." Fig. 23—the Swift Camel, mounted. "The wandering Arab and his Maherry have an extraordinary appearance, which Captain Lyon has described. The saddle is placed on the withers, and confined by a band under the belly. It is very small and difficult to set, which is done by balancing the feet against the neck of the animal and holding a tight rein to steady the hand." Fig. 24—a Malefactor after punishment, paraded on a camel; his crime and sentence being proclaimed as he is led along. Fig. 25—an Attack, by Arab robbers, upon a Caravan in the Desert. Fig. 26—a Bedouin Encampment. "Those who are, from reading or travelled observation, conversant with the existing manners of the Asiatic pastoral tribes, as the Arabians and the Tartars, can easily form in their minds a picture of this great migrating party. Under the conduct of their venerable emir, and the active direction and control of his principal servants, we behold, from the distance, a lengthened dark line stretching across the plain, or winding among the valleys, or creeping down the narrow pathway on the mountain-side. That in this line there are hosts of camels we know afar off by the grotesque outline which the figures of these animals make, their tall shapes, and their length of neck; and that the less distinguishable mass which appears in motion on the surface of the ground is composed of flocks of sheep, and perhaps goats, we can only

25.—Attack by Arab Robbers.

infer from eireumstances. On approaching nearer we find that all this is true, and that, moreover, many of the eamels are laden with the tents, and with a few utensils and needments whieh the dwellers in tents require ; and if the natural eondition of the traversed eountry be such as to render the precaution neeessary, some of the animals may be seen bearing provisions and skins of water. The baggage eamels follow eaeh other with steady and heavy tread, in files, the halter of those that follow being tied to the harness of those that precede, so that the foremost only needs a rider to direet his eourse; but nevertheless women, ehildren, and old men are seen mounted on the other burdens which some of them bear. These are slaves, retainers, and other persons not actively engaged in the eonduct of the party, and not of suffieient consequenee to ride on saddled dromedaries. Such are reserved for the chiefs of the party, their women, children, relatives, and friends; and are not, unless it happen for convenienee, strung together like the drudging animals whieh bear the heavier burdens."

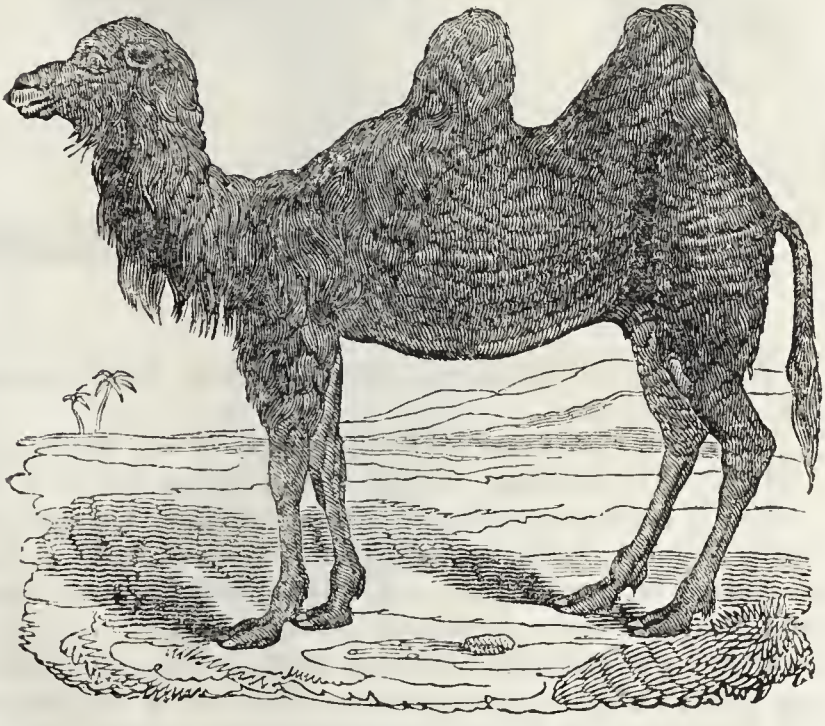
The Bactrian Camel (*Camelus Bactrianus*).

This species is at once to be distinguished from the Arabian by the presence of two humps on the back. (Fig. 27.) It is eomparatively rare, and limited in the extent of geographie range: it is spread, however, through eentral Asia, Thibet, and China, and is reported to exist in a wild state in Turkestan, anciently Bactriana. Pallas states that very large eamels with two hunches occur wild in the deserts of Shamo, towards the frontiers of China ; but as the Calmucks liberate all animals upon a principle of religion, we may conclude that these camels are the deseendants of the domestic stock. Oecasionally the Baetrian camel is seen in Egypt and Arabia: during his travels through the latter country Niebuhr saw three, and only three, specimens ; and Mr. Mae Farlane met with only one in Asia Minor, whieh eame from some remote provinee.

In 1829 a Bactrian eamel was daily led about the

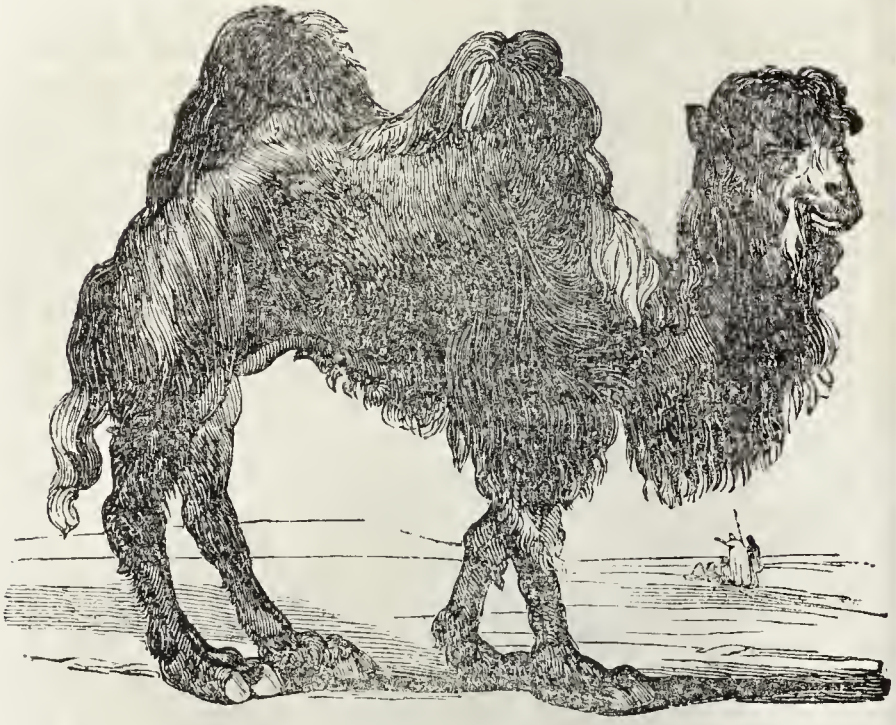
26.—Bedouin Encampment.

streets of London ; it was a very fine male, of a dark rusty-brown colour, and very picturesque and striking in appearance, walking with a stately pace, and apparently well able to bear our climate. His hair was full, long, and shaggy, and hung like a fringe along his throat. (Fig. 28.) The natural country of this species, viz. the great middle zone of Asia, to the north of the Taurus and the Himalayah mountains, is very different in temperature from the hot regions of Arabia, whence it is probable that it might with due precautions become naturalized in Europe.



27.—Bactrian Camel.

The manners of the Bactrian camel are the same as those of the Arabian, and its utility is as great as that of the latter. It is the patient, laborious, and willing slave of man, travelling over sandy deserts, and administering to the wants of a wandering people.



28.—Bactrian Camel.

The height of this species is about eight feet between the two humps.

Here, then, we conclude our sketch of the history of the camel—an animal, in the countries for which it is specially organized, the most important and valuable to man, and one of the earliest which he reclaimed to his service. It is true that it has not spread, like the horse and the ox, over the whole globe, but the reason is evident: out of its own regions its value and importance are diminished; within them no other beast of burden can compete with it, and for ever will it remain, as it is and has been, the ship of the desert.

Genus Auchenia.

The Llama.

Under the general term Llama are comprehended three, if not more species, which belong to the same

section of the Ruminants as the camel (*Camelidæ*). Indeed the llama was referred by Linnæus, and other naturalists of the last century, to the genus *Camelus*; from which Illiger separated it, and assigned it to a genus which he established under the title of *Auchenia*, in allusion to the length and slenderness of the neck, for which the llamas are remarkable.

The llamas may be regarded as the analogues of the camel; and, in the Cordilleras of Peru and Chili, are the mountain representatives of that desert-born servant of man.

29.—Foot of Llama.

In outward form, excepting that there is no hump on the back, in the general structure and cellular apparatus of the stomach, with the concomitant power of enduring thirst or abstaining for a long season from water, in the expression of the large full overhung eye, in the mobility and division of the upper lip, the fissured nostrils, the slender neck, and meagre limbs, together

with the long woolly character of the clothing, the llama and the camel exhibit striking points of agreement. The foot of the camel, however, with its broad elastic pad, expressly adapted for traversing the sands of the desert, differs in its modification from that of the llama, destined to inhabit the rough and rocky Cordilleras, along the craggy sides of which the llama proceeds with a free and fearless step.

The foot of the llama (Fig. 29) consists of two springy toes, completely divided, each with a rough cushion beneath, and provided at the end with a strong short hoof; these hoofs are pointed at the tip, and hooked down somewhat like a claw; they are compressed laterally, and the upper surface represents an acute ridge; the under surface is linearly concave—a form well fitted for a mountain climber.

When the Spaniards first invaded Peru and Chili, they found the llama domesticated and used as a beast of burden, its flesh and wool being also in great request. (Fig. 30.) It was their only beast of burden: its flesh was eaten, its skin prepared into leather, and its wool spun and manufactured into cloth. One of the labours to which the llama was subjected was that of bringing down ore from the mines among the mountains: its ordinary load was eighty or one hundred pounds, and its average rate of travelling with its burden twelve to fifteen miles a-day, over rugged mountain-passes; but, like the camel, if too heavily laden it would lie down, and obstinately refuse to proceed, nor would it bear to be urged beyond its accustomed pace. Gregory de Bolivar estimated that in his day three hundred thousand were employed in the transport of the produce of the mines of Potosi alone, and four millions annually killed for food.

Augustin de Zerate, treasurer-general of Peru, in 1544, under the Spanish dominion, thus describes the llama, which he calls a sheep, though it is, he observes, camel-like in shape, but destitute of a hump:—"In places where there is no snow the natives want water, and to supply this they fill the skins of sheep with water,

30.—Tame Llama (white).

and make other living sheep carry them, for it must be remarked these sheep of Peru are large enough to serve as beasts of burden. They can carry about one hundred pounds or more, and the Spaniards used to ride them, and they would go four or five leagues a-day. When they are weary they lie down upon the ground, and, as there are no means of making them get up, either by

beating or assisting them, the load must of necessity be taken off. When there is a man on one of them, if the beast is tired, and urged to go on, he turns his head round, and discharges his saliva, which has an unpleasant odour, into the rider's face. These animals are of great use and profit to their masters, for their wool is very good and fine, particularly that of the species called Pacas, which have very long fleeces; and the expense of their food is trifling, as a handful of maize suffices them, and they can go four or five days without water. Their flesh is as good as that of the fat sheep of Castile. There are now public shambles for the sale of their flesh in all parts of Peru, which was not the case when the Spaniards came first; for when one Indian had killed a sheep his neighbours came and took what they wanted, and then another Indian killed a sheep in his turn."

D'Acosta gives nearly a similar testimony; and notices two kinds (species)—one which is woolly, and called Paco by the natives; the other covered with a slight fleece (*villis levibus*) only, and nearly naked, whence it is more fitted for carrying burthens, called Guanaco. Captain G. Shelvocke, an Englishman who sailed round the world in 1719-22, thus describes the llamas which he saw at Arica, in Peru :—

"For the carriage of the guana the people at Arica generally use that sort of little camels which the Indians of Peru call *llamas;* the Chilese, *chilihueque;* and the Spaniards, *carneros de la tierra*, or native sheep. The heads of these animals are small in proportion to their bodies, and are somewhat in shape between the head of a horse and that of a sheep, the upper lips being cleft, like that of a hare, through which they can spit to the distance of ten paces against any one who offends them; and if the spittle happens to fall on the face of a person, it causes a red itchy spot. Their necks are long and concavely bent downwards, like that of a camel, which animal they greatly resemble, except in having no hunch on their backs, and in being much smaller. Their ordinary height is from four feet to four and half, and their

ordinary burden does not exceed an hundredweight. They walk, holding up their heads, with wonderful gravity, and at so regular a pace as no beating can quicken. At night it is impossible to make them move with their loads, for they lie down till these are taken off, and then go to graze. Their ordinary food is a sort of grass called ycho, somewhat like a small rush, but finer, and has a sharp point, with which all the mountains are covered exclusively. They eat little, and never drink, so that they are easily maintained. They have cloven feet, like sheep, and are used at the mines to carry ore to the mills; and, as soon as loaded, they set off without any guide to the place where they are usually unloaded.

"They have a sort of spur above the foot, which renders them sure-footed among the rocks, as it serves as a sort of hook to hold by.* Their hair, or wool rather, is long, white, gray, and russet, in spots, and fine, but much inferior to that of the vicunna (*vigonia*), and has a strong and disagreeable scent.

"The vicuña is shaped much like the llama, but much smaller and lighter, their wool being extraordinarily fine, and much valued. These animals are often hunted after the following manner:—Many Indians gather together, and drive them into some narrow pass, across which they have previously extended cords about four feet from the ground, having bits of wool or cloth hanging to them at small distances. This so frightens them that they dare not pass, and they gather together in a string, when the Indians kill them with stones tied to the ends of leather thongs. Should any guanacos happen to be among the flock, these leap over the cords and are followed by all the vicunnas. These *guanacos* are larger and more corpulent, and are also called viscachas.

"There is yet another animal of this kind, called *alpagnes* (alpacas), having wool of extraordinary fineness; but their legs are shorter, and their snouts con-

* This is fabulous.

tracted in such a manner as to give them some resemblance to the human countenance.

"The Indians make several uses of these creatures; some of which carry burdens of about an hundredweight. Their wool serves to make stuffs, cords, and sacks; their bones are used for the construction of weavers' utensils; and their dung is employed as fuel for dressing meat and warming their huts."*

31.—Guanaco.

With respect to the distinct species of llama, we learn from De Laet that, besides the domestic race, there are in Peru and Chili various wild animals, of which some are called Guanaco, or Huanacu (Fig. 31), whence, from their resemblance to the tame breed, the latter have obtained the same appellation. Their flesh is good, but, according to Garcilaso, inferior to that of the do-

* Kerr's Collection of Voyages, vol. x., p. 462.

32.—Male Brown Wild Llama or Guanaco.

mestic or Huanacu llamas. These animals inhabit the mountain-ranges, where the males keep watch above whilst the females are feeding in the alpine valleys. (Fig. 32). When the males observe men approaching in the distance, they utter a sort of neigh, not unlike that of a horse, to warn the females; and if the men advance nearer, they flee, driving the females before them. The wool of these animals is short and rough, but is notwithstanding used by the natives for making cloth. These animals are taken in traps and snares. Another kind are termed Vicuñas; excepting that they have no horns, they are not much unlike goats, but are

larger, and of a tawny or lion-like colour with a rufous tint: these live in the highest mountains, giving preference to the colder regions, and especially the bleak solitudes which the Peruvians designate by the common name of Punas. Frost and snow, so far from annoying, seem rather to invigorate them. They associate in flocks, and run with great swiftness. Such is their timidity that at the sight of men or wild beasts they instantly betake themselves into hidden and inaccessible fortresses. Formerly these animals were very numerous, but they are now become much more rare in consequence of the promiscuous licence for hunting. Their wool is very fine, and resembles silk, or rather the fur of the beaver, and the natives deservedly estimate it highly: besides other properties, it is said to resist heat and impart coolness, and consequently is especially used in the manufacture of caps. Besides these are the Tarugas or Tarucas, which are larger and more swift than the vicuñas, and of a more burnt colour, with pendulous and light ears; they rarely associate in flocks, but wander singly about the precipices: according to Garcilaso they are a species of deer, inferior in size to those of Europe. In the time of the Incas they were innumerable, and even entered the precincts of the towns, nor was there any deficiency of their fawns and does. All these animals, he adds, produce bezoar-stones.

A question here arises, what is the taruga described by De Laet? Is it identical with the paco (otherwise called paca or alpaca) of D'Acosta, who, it may be observed, does not mention the vicuña or vicugna? This question is not easily answered. With respect to the Chilihueque of Shelvocke, the Hueque or Hueco of Molina, it is evidently identical with the Huanacu of De Laet, which is the guanaco, and the words are the same, with trifling differences in orthography easily accounted for. We have then the domestic llama, the guanaco, the paco or alpaca, the taruga, and the vicugna.

Now it is generally believed by naturalists, and among them F. Cuvier, that there are really only three species,

viz. the llama, called, when wild, guanaco, the paco or alpaca, and the vicugna. Mr. Bennett, indeed, and Baron Cuvier, suspect there are but two species. The former expressly states that he should have little hesitation in proceeding still farther than F. Cuvier, being strongly inclined to agree with the Baron in regarding the paco as a mere variety of the llama with the wool more amply developed, and in considering the vicugna as the only animal of that group that deserves to be specifically distinguished from that animal. From our own personal observations we are inclined to believe that there are three species, as indicated by F. Cuvier; but we confess that we have our doubts as to whether De Laet's taruga with pendulous ears may not prove to be a fourth species—a point, however, on which we would not insist.

The Guanaco (*Auchenia llama*); in a domestic state, the Llama.—At what period the guanaco became domesticated, whether before the foundation of the ancient Peruvian empire while the natives were in the rudest state of savage life, or after Manco Capac had established over the Peruvians the reigning line of Incas, it is useless to inquire. All we know is, that the Spaniards on their invasion found the llama trained as a beast of burden, and, excepting as regards its milk, to them what the camel is to the native of the Arabian desert.

The guanaco, or wild llama, is more slender and has an aspect more expressive of energy and spirit than its domesticated relative, but it soon becomes familiar in captivity. (Fig. 33.) In its native regions, the highlands of Peru and Chili, it lives in herds, continuing among the mountains during the summer, but descending to the valleys on the approach of winter. At this latter season the Chilians hunt them with dogs, but it is only the young and the feeble that can be thus taken; the old ones are swift, active, and vigorous, and easily escape. During the chase they are said frequently to turn upon their pursuers, neigh loudly, and then take to their heels again. Indeed, when alarmed they often stop in their flight to gaze at the object of their fear, and again gallop off.

33.—Guanaco.

The guanaco feeds upon mountain herbage, and especially a species of rushy grass called ycho; and when there is sufficient of this green fodder for them, they are never known to drink. The same observation applies to the domestic breed and the paco and the vicugna. Mr. Bennett suggests as a probability that they may have the power of extracting from their food

sufficient liquid to satiate their thirst. It cannot have escaped notice that the secretion of saliva in these animals is remarkably abundant, even, as we have observed, in the hottest weather in England, and that upon the slightest offence, real or supposed, they discharge a copious shower of it over the person of the offender. May it not be that the naturally abundant flow of this saliva obviates the necessity of frequently drinking? This saliva was once supposed to possess acrid, irritating qualities, which certainly is not the case, though it must be confessed a sprinkling with rose-water would be more pleasant.

When assaulted and pushed to defend themselves, these animals strike with their fore-feet, and that with great energy, giving very severe blows: we have, indeed, seen them strike upon trifling provocation, though in general they are quiet and inoffensive.

The wool of the guanaco is in request, being of fine texture: the general colour is rich rufous brown, the head and ears being gray. The neck is peculiarly long; the tail a little raised and curved down. Height at the top of the shoulders about three feet and a half.

Mr. Darwin states, the guanaco "abounds over the whole of the temperate parts of South America from the wooded islands of Tierra del Fuego, through Patagonia, the hilly parts of La Plata, Chili, even to the Cordillera of Peru. Although preferring an elevated site, it yields in this respect to its near relative the vicugna; on the plains of Southern Patagonia we saw them in greater numbers than in any other part. Generally they go in small herds from half-a-dozen to thirty together, but on the banks of the St. Cruz we saw one herd which must have contained at least five hundred. On the northern shores of the Strait of Magellan they are also very numerous. Generally the guanacoes are wild and extremely wary. The sportsman frequently receives the first intimation of their presence by hearing from a distance the peculiar shrill neighing note of alarm. If he then looks attentively, he will perhaps see the herd standing in a line on some distant hill. On approaching them,

a few more squeals are given, and then off they set at an apparently slow, but really quick, canter along some narrow beaten track to a neighbouring hill. If, however, by chance he should abruptly meet a single animal, or several together, they will generally stand motionless and intently gaze at him; then, perhaps, move on a few yards, turn round, and look again. What is the cause of this difference in their shyness? Do they mistake a man in the distance for their chief enemy, the puma, or does curiosity overcome their timidity? That they are curious is certain; for if a person lies on the ground and plays strange antics, such as throwing up his feet in the air, they will almost always approach by degrees to reconnoitre him. It was an artifice that was frequently practised by our sportsmen with success; and it had, moreover, the advantage of allowing several shots to be fired, which were all taken as parts of the performance. On the mountains of Tierra del Fuego, and in other places, I have more than once seen a guanaco, on being approached, not only neigh and squeal, but prance and leap about in the most ridiculous manner, apparently in defiance as a challenge. These animals are very easily domesticated, and I have seen some thus kept near the houses, although at large, on their native plains. They are in this state very bold, and readily attack a man by striking him from behind with both knees. The wild guanacoes, however, have no idea of defence: even a single dog will secure one of these large animals till the huntsman can come up. In many of their habits they are like sheep in a flock. Thus, when they see men approaching in different directions on horseback, they soon become bewildered and know not which way to run. This greatly faciliates the Indian method of hunting, for they are thus easily driven to a central point and encompassed. The guanacoes readily take to the water; several times at Port Valdes they were seen swimming from island to island. Byron, in his Voyage, says he saw them drinking salt water. Some of our officers, likewise, saw a herd drinking the briny fluid from salina near Cape Blanca. I imagine, in several parts of the

country, if they do not drink salt water, they drink none at all. In the middle of the day they frequently roll in the dust in saucer-shaped hollows. The males fight together; two one day passed quite close to me, squealing, and trying to bite each other; and several were shot with their hides deeply scored. Herds sometimes appear to set out on exploring parties. At Bahia Blanca, where, within thirty miles of the coast, these animals are extremely unfrequent, I saw one day the tracks of thirty or forty which had come in a direct line to a muddy salt-water creek. They must then have perceived that they were approaching the sea, for they had wheeled with the regularity of cavalry, and had returned back in as straight a line as they had advanced. The guanacoes have one singular habit, which is to me inexplicable, namely, that on successive days they drop their dung in the same defined heap. I saw one of these heaps, which was eight feet in diameter, and necessarily was composed of a large quantity. D'Aubigny says that all the species of this genus have this habit; and Frezier remarks that it is very useful to the Indians, who use the dung for fuel, and are thus saved the trouble of collecting it. The guanacoes appear to have favourite spots for dying in. On the banks of the St. Cruz the ground was actually white with bones in certain circumscribed places, which were generally bushy, and all near the river. On one such spot I counted between ten and twenty heads. I particularly examined the bones; they did not appear, as some scattered ones which I have seen, gnawed and broken, as if dragged together by some beasts of prey. The animals must have crawled, before dying, beneath and amongst the bushes. Mr. Bynoe informs me that during the voyage he observed the same circumstance on the banks of the Rio Gallegos. I do not understand the reason for this, but I may observe that all the wounded guanacoes at St. Cruz invariably walked towards the river. At St. Jago, in the Cape de Verd islands, I remember having seen in a retired ravine a corner under a cliff where numerous goats' bones were collected: we at the time exclaimed

that it was the burial-ground of all the goats in the island. I mention these circumstances, because in certain cases they might explain the occurrence of a number of uninjured bones in a cave, or buried under alluvial accumulations, and likewise the cause why certain mammalia are more commonly imbedded than others in sedimentary deposits. Any great flood of the St. Cruz would wash down many bones of the guanaco, but probably not a single one of the puma, rhea, or fox." ('Voyage of the Beagle.')

34.—White Llama.

Like the elephant, the horse, the camel, and many others, the guanaco has its fossil prototypes. Mr. Darwin found at Port St. Julian (Patagonia) the fossil bones of a llama which must have fully equalled the camel in magnitude; and he observes that, "as the guanaco is the characteristic quadruped of Patagonia, and the vicugna of the snow-clad summits of the Cordilleras, so

in bygone days this gigantic species of the same family must have been conspicuous on the southern plains."

The domestic llama is more stoutly built than the guanaco, its limbs are thicker, its neck shorter, and its aspect more subdued. The wool is longer and fuller, but of a coarser quality. We have seen brown and white individuals, but the white seem to be the most common. (Fig. 34.)

When the Spaniards became acquainted with Peru and Chili, these animals were kept by the natives in vast numbers; but now the horse, the ass, and especially the mule, have superseded the llama as a beast of burthen; while the introduction of the sheep, the goat, and the ox has rendered it less necessary, either as contributing by its flesh or its fleece to the benefit of man. In some places, however, it still is, or was recently, employed as a beast of burthen.

The Paco

(*Auchenia alpaca*, Desm.; *Camelus pacos*, Linn.).

The paco (Fig. 35) is as large as the guanaco, but proportionately shorter in the limbs; its forehead, instead of being regularly arched to the nose, rises abruptly prominent above the eyes; the wool is long, delicately fine, and silky, excepting on the head and limbs, and of a deep fawn colour; it is moreover disposed in long flakes or tassels. Black varieties also occur, of which a most beautiful specimen some years ago existed in the Gardens of the Zool. Soc. Lond.

The paco dwells in herds among the mountains of Peru and Chili; it is less fleet than the light-limbed guanaco, but its general habits are the same; it would appear, however, to frequent a higher and colder range of elevation, as it is said to be frequently seen with herds of vicugnas.

The Vicugna, or Vicuña (*Auchenia vicugna*),

is a smaller animal than either the guanaco or the paco, and more slender in its proportions. (Fig. 36.) Its

35.—Paco.

limbs are thin, its neck swanlike, the forehead is broad and also prominent, but not abruptly so, as in the paco; the muzzle is very narrow, and the head short. The eyes are large, and the ears long. The height of the animal at the shoulder is about two and a half feet.

The wool of the body is extremely delicate and soft, varying from an inch to three inches in length: on the breast it is of the latter measurement; on the head and limbs it is close. The colour is pale yellowish brown, passing into white on the under parts.

The vicugna lives in herds on the bleak and elevated parts of the mountain-range bordering the region of

perpetual snow, amidst rocks and precipices, where the chase is both toilsome and arduous. The Cordilleras of Copiapo, Coquimbo, and Peru are the principal seats of its abode, but it is also found in Chili. Its manners very much resemble those of the chamois of the European Alps, and it is as active, vigilant, wild, and timid. Its wool is highly valued, and for this alone thousands are annually killed, various means being employed in their wholesale destruction.

Holding, as the llamas do, especially the paco and vicugna, so conspicuous a place among wool-bearing animals, it is singular that, after Europeans became acquainted with them, and with the beautiful fabrics

36 —V cugna.

manufactured by the native Peruvians, three centuries should have elapsed before any attention was paid in Europe to the importation of their produce as an article of commerce, or any attempts were instituted with regard to the naturalization of the animals in localities best fitted for their multiplication; and this more especially as the fineness of the wool had, from the first, attracted the notice both of the Spaniards and other Europeans. That no difficulty exists in the transportation of the llama to Europe, and that it bears our climate well, is abundantly proved by the numerous individuals which have lived both in the Gardens of the Zoological Society and in other places, and which, under the inevitable disadvantages of confinement, and perhaps too luxurious a diet, have continued long in health and vigour—as long, indeed, as animals indigenous to Europe under the same circumstances. There can be therefore no doubt but that, if suffered to wander at large, in situations resembling as nearly as possible those of their native regions —regions, be it remembered, of cold, and snow, and storms—these animals would thrive and multiply.

The coarse herbage of the mountains, and the rushy grass, called yeho, which covers the slopes of the hills, constitute the natural diet of the wild races; and in the mountains of Scotland, Wales, and Ireland herbage of a corresponding nature would meet their appetite, while, as far as temperature is concerned, there would be no impediment to their naturalization.

At the ninth Meeting (held at Birmingham 1839) for the Advancement of Science, the value of the silk wool of these animals, and the benefits which would result from their naturalization in our country, formed an interesting topic of discussion. The subject was introduced by Mr. W. Danson, who, in illustration of his views, exhibited samples of alpaca wools, and manufactured specimens in imitation of silk (and without dye) as black as jet. Mr. Danson urged that "the animals producing it ought to be propagated in England, Ireland, Scotland, and Wales, and stated that to the two latter places the alpaca is well suited, being an inhabitant of the Cordilleras, or

mountain district in Peru. Importations (of the wool) have already taken place to the extent of one million of pounds, and are likely to increase. There are five species of llamas: of these the alpaca has fine wool, six to twelve inches long, as shown by the specimens exhibited; the llama, coarse long hair; and the vicugna, a very short fine wool, more of the beaver cast. The Earl of Derby has propagated the alpaca in his private menagerie at Knowsley, and Mr. Danson understood that Mr. Stephenson, at Oban, in Scotland, has a few of these animals. The wool of these animals would not enter into competition with the wool of the sheep, but rather with silk. It is capable of the finest manufacture, and is especially suited to the fine shawl trade of Paisley and Glasgow, &c. The yarns spun from it are already sent to France in large quantities, at from 6*s.* to 12*s.* 6*d.* per pound, the price of the raw alpaca wool being now 2*s.* and 2*s.* 6*d.* per pound."

The Giraffe

(*Camelopardalis giraffa;* Zarapha, Zerafet, and Zürafel of the Arabs; Sürnapa, Zürnapa, and Zürnepa of the Turks).

The genus *Camelopardalis* stands in a certain sense isolated among the Ruminants, and is the representative of a family group, intermediate, as Professor Owen's researches demonstrate, between the deer and the antelopes. Col. H. Smith, indeed, has observed that the characters of the giraffe offer a mixture of several genera, among which the followers of the quinary system may select whether to class it, with Illiger, among the camels, or, with other naturalists, among the cervine or antelopine animals; and he points out its assimilation with the camels, in the length of its neck, the callosities on the sternum and knees, and the want of spurious hoofs, adding that this approximation did not escape the notice of the ancients.

This extraordinary animal, of which at one period the very existence was almost doubted, has become now

familiar to us; and though we gaze with wonder upon its strange proportions, we no longer regard it as one of the monsters of a land which credulity pictured as tenanted by creatures which exist only in imagination. On beholding the giraffe we are at once struck with the shortness of its body, the length of its limbs, the elevation of its withers, and the elongation and slenderness of its neck, supporting a small and delicately modelled head. Its movements are no less strange than its figure; for, owing to the shortness of the body and the length of the limbs, the hind-hoofs are brought at each step as far forward as the spot the previous moment occupied by the fore-hoofs, but somewhat to the outside of it, for the hind-limbs diverge somewhat outward from the hock-joint. The legs of each side are in action nearly in unison together, those of the right side appearing to alternate with those of the left, and *vice versâ*.

The giraffe, however, is not really awkward, and is very far from being slow; indeed the swiftest coursers of the desert are scarcely equal to the chase, and among rugged and broken ground utterly unable to overtake it.

When walking along, the giraffe does not ordinarily carry its beautiful swan-like neck upright, but obliquely forwards in a line continued from the spine, over the withers, to the top of the head—an attitude scarcely consistent with grace; the animal, however, often wreaths it very gracefully, nor can anything produce a more imposing effect than the giraffe when its neck is stretched up to the full, while the animal gazes around with his large beaming eyes, or plucks the foliage from the branches of the trees, browsing beneath their shade.

It is scarcely necessary to state that the giraffe is exclusively confined to the continent of Africa. Its characters may be detailed as follows:—The head (Fig. 37) is small, and narrows to a slender elongated muzzle entirely covered with hair. The nostrils are longitudinal slits capable of being closed or opened at pleasure; the upper lip is endowed with great flexibility and muscular power, and projects beyond the lower; it is used as an organ of prehension in the acquisition of food. The

37.—Head of Giraffe.

tongue is an extraordinary instrument, and requires special notice. It is long, slender, pointed, and endowed with a surprising share of mobility. Nor is this all; it is capable of being greatly elongated, and in this state of being coiled round twigs or branches, and of drawing them to the mouth. (Figs. 38 and 39.) In this respect it is analogous to the proboscis of the elephant, and is at once a feeler, a grasper, and an organ of taste. It is

interesting to see with what address the giraffe uses this instrument, and how dexterously he applies it as a hook or holder. It is smooth, except when the papillæ are raised—its surface then becomes rough: its colour is black.

Sir Everard Home, whose notice of everything rare or curious in the animal world would naturally be excited by the presence of the giraffe, has published a very interesting memoir upon its tongue, which was originally read to the Royal Society, and now appears in the fifth volume of his 'Comparative Anatomy.' We shall select some passages; and shall further avail ourselves of his kind indulgence to copy two plates with which the memoir is illustrated:—

38.—Mode of procuring food.

"The tongue is to be considered as a congeries of muscles acting upon one another, and in this respect differing from muscles applied to bones and other solid substances; but that of the xariffa has so many peculi-

39.—Mode of procuring food.

arities, as, in my opinion, give it a claim to be considered separately from the tongues of other animals, and viewed as a construction in which a greater variety of actions are displayed than are to be met with in others. It not only performs the office of the organ of taste, but has besides nearly all the powers of the proboscis of the elephant, although not possessed of the same strength. They differ, indeed, in one being an elongation of the organ of smell—the other of the organ of taste. The

proboscis is restrained from elongation in extent beyond one inch, by means of the cartilaginous tubes it contains; but the xariffa's tongue, which, when extended after death, is seventeen inches long, can, in the living body, be so diminished in size as to be enclosed within the animal's mouth. For this alteration in bulk some peculiar mechanism is required, since we know from experiments recorded in the 'Philosophical Transactions' that a muscle, whether contracted or relaxed, occupies exactly the same space. The chameleon, it is true, has a power of darting the point of its tongue to the extent of twelve inches, and catching a fly at that distance; but there is a conical bone in the middle of a muscular tube, both to give direction, and by its form, when the circular fibres press upon it, making them slide forward.

"In the absence of an opportunity of examining the internal structure of the xariffa's tongue after death, I was led to the opinion that the change of size is effected by the organ containing a reservoir, out of the course of the circulation, which can be filled with blood at the will of the animal, so as to give it rigidity, and enable it to extend itself for the performance of the different actions in which it is employed, with the smallest possible degree of muscular exertion. It occurred to me at the same time, that whatever construction may be the means by which the xariffa's tongue is able to apply itself to such various purposes, whether that which appeared to me probable, or any other, something similar would be met with in other animals, particularly in the tongue of the deer, which, after death, readily admits of being drawn out to the extent of eight inches, although when immersed in rectified spirits it contracts to five inches.

"For the purpose of such an examination, a deer's tongue, recently after the animal's death, was injected with minute red injection, so as to distend the arteries, and show the course of the circulation in them to the greatest advantage. This tongue was afterwards divided longitudinally in a perpendicular direction, also in a horizontal one, to show the muscles of which it is com-

posed, as well as the other parts that it contained. From this examination, the structure of the tongue of quadrupeds in general is as follows: —

"It is longitudinally divided into two equal portions by a middle line; the muscular structure occupies the whole of the interior substance, receiving a large supply of nerves and blood-vessels from a lateral nerve and artery that pass along the outer edge; these are imbedded in a very loose cellular tissue, the texture of which admits of the blood-vessels being distended to a very great degree, so as to enlarge the volume of the tongue; and beyond this tissue, surrounding and forming a case for the whole of the upper and lateral part of the organ, is a strong, very elastic covering of some thickness, which yields when the muscles and the trunks of the arteries are distended with blood, so as to give both extent and rigidity to the organ, and admits of the different actions in which it is employed.

"There can be no doubt of the structure of the xariffa's tongue being the same; its actions depending upon the combined powers of muscular contraction and elasticity; its increase and diminution of size arising from the blood-vessels being at one time loaded with blood, at another empty.

"It is deserving of observation that these peculiarities, found in the tongue of the xariffa for its elongation, are not extended to the camel and dromedary. These animals have a provision of another kind, enabling them to inhabit the sandy desert; this is, a reservoir connected with the stomach, in which they carry a supply of water, and which is probably wanting in the xariffa, or of a smaller size; and in lieu of it, this animal has a power at all times of feeding on plants that are alive and full of moisture, and therefore can subsist without drinking. As the sandy desert is deficient in trees, we have a proof of its not being the xariffa's native soil, and find that, instead of the padded hoofs, whose cushion is fitted for travelling in the sand, it has two toes separated from each other, which are defended by a strong horny covering, enabling it to climb the higher rocky ground with-

out stumbling. That it may have every facility in obtaining the branches and leaves of trees—its natural food—its neck is of a greater length than that of any animal of the same size, and is composed of only seven bones, exactly the same number that is met with in the human skeleton: this is evidently adapted for its reaching its food, and the smaller number of joints allows it to be kept erect at the smallest expense of muscular exertion. The tongue is everywhere smooth and slightly adhesive; it has spots upon it, but these are not raised above the surface. The application of this organ to the leaves, before they are carried into the mouth, enables the animal to reject those of noxious plants, only selecting such as have an agreeable taste.". . . . . .

"The tree which is said to be its favourite food is an acacia, and now distinguished from the rest of the tribe by the trivial name acacia xariffiana. I have tasted it both boiled and in a natural state; it has a pleasant flavour, and the twigs are succulent. As the tongue, in procuring and tasting its food, is much exposed to the sun's rays, it is furnished with a black rete mucosum, to prevent its being blistered.

"The mode in which it lays hold of the succulent branches of trees, and many of its other motions, are shown in the sketch (Fig. 38) from the pencil of Mr. Agasse.

"In comparing the quantity of moisture in common grass, on which sheep feed, with that of the twigs and leaves of the acacia lophantha, which nearly resembles the acacia xariffiana, it is as follows: one ounce of the leaves and twigs in drying lost three-fourths; one ounce of common grass, or twenty-four scruples, lost ten, less than half by two scruples. When sheep are fed on hay, they are allowed four pounds a day and two pounds of water, which is a smaller quantity of fluid than is contained in the succulent food of the xariffa; so that this animal cannot require any drink for the purpose of digesting its food."

The eyes of the giraffe are full, dark, lustrous, and prominent, and the upper eyelid is furnished with a

fringe of long lashes. So prominent indeed are the eyes, that they command, without the animal moving its head, a survey of the whole horizon, thus enabling it to see, without turning, what passes on each side and even behind it, and, from the elevation of the head, to discern its enemies at a great distance. Fig. 40 represents a

40.—Back view of Giraffe's Head.

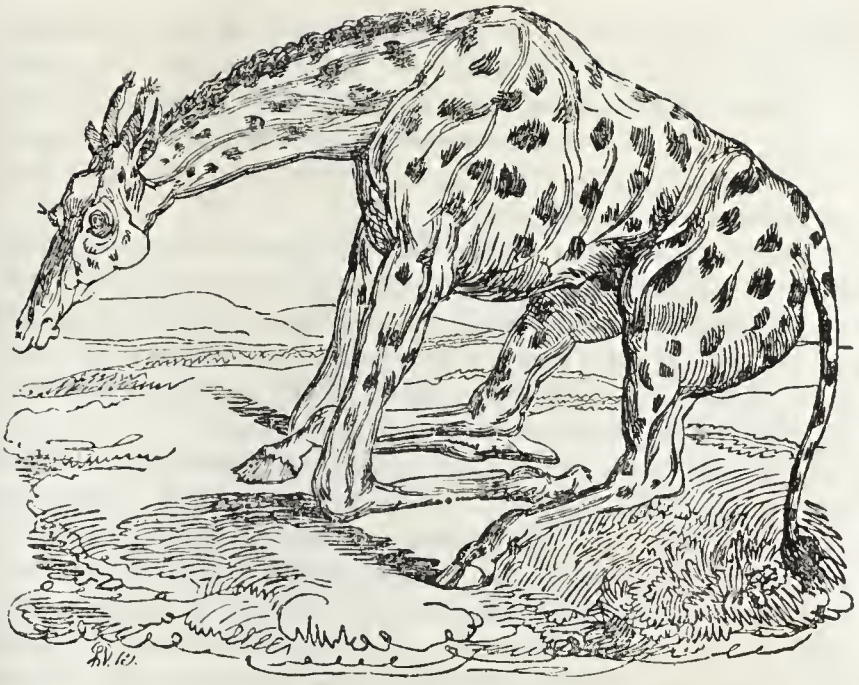
back view of the giraffe's head, showing this advantageous position of the eyes. The ears are long, pointed, and movable; and the sense of hearing is very acute. There are no suborbital sinuses. Both sexes have horns, if they can be so termed, for they are truly analogous to the peduncles of the horns in the Muntjak-deer, being in fact processes of bone covered with skin, having a tuft of black hairs at the top; but besides these substitutes for horns, a similar but shorter process projects from the forehead between the eyes, more developed in males than females, and in adults than in the young. According to Rüppell and Cuvier, this, like the other horns, is articulated by suture to the skull; but Professor Owen has demonstrated that this frontal protuberance is not a true horn articulated by a suture, but results from a singular thickening of the bone of the forehead. (Fig.

41.) The osseous peduncles, or horns as they are commonly called, continue for a long time united to the frontal bone only by means of a suture, and are not fairly anchylosed till at an advanced period. This indeed is the case with all the bones of the skull of the giraffe: it would appear that the process of ossification is carried on but slowly in this part of the frame-work, and, as it respects the horns, that Nature, having completed the first stage of her intentions, having in fact prepared the peduncles, was arrested in her operations and forbidden to add the antlers.

41.—Skull of Giraffe.

The long flexible neck of the giraffe is provided with a short mane extending from the withers to the top of the head: the elevation of the withers is remarkable, and from this part to the crupper there is a rapid descent, whence has arisen the idea that the fore-limbs are much longer than the hinder pair, which is not the case. The fore-knees are large, and when about to lie down the animal sinks upon them, and assumes an attitude by no means easy or graceful. (Fig. 42.)

The tail is rather long, slender, and tufted at the ex-



42.—Giraffe about to lie down.

tremity with long coarse black hairs. The skeleton of the giraffe is well worthy the attention of an anatomist; we cannot here enter into osteological minutiæ, but recommend our readers to Professor Owen's papers in 'Proceeds. Zool. Soc.' 1838; and to Cuvier's 'Leçons d'Anatomie Comparée.'

In giving a sketch of the history of the giraffe, we may commence by observing that some naturalists of the present day consider that there are two distinct species; one peculiar to Nubia, Abyssinia, and the adjacent districts, the other a native of the regions of Southern Africa. We regard them as mere varieties.

It is with the North African variety that the ancients were acquainted, and of which there are several delineations preserved to the present day. Among the most remarkable is one on the Prænestine pavement, where two of these animals are pictured: one in a straddling attitude endeavouring to reach the ground with his mouth; the other in the act of browsing on the trees.

It is supposed that this pavement, which was executed by the direction of Sulla, is the work of Egyptian Greeks. Belzoni notices the giraffe on the walls of the Sekos of the Memnonium and on the back of the temple of Erments. A giraffe led by Nubians is given in Rosellini's work on Egypt.

It is supposed by some that the word Zemer, translated Chamois in the book of Deuteronomy (ch. xiv., ver. 5), of which animal the flesh was forbidden, really refers to the giraffe, and there is certainly some affinity between the Hebrew zemer and the Arabic zurafa or zurafet. It is a point, however, not easily decided.

Though the Prænestine pavement was made by the orders of Sulla (born A.C. 138), the animal itself was not seen in Rome before the time of Julius Cæsar, who exhibited it at the Circensian games. It is described by Pliny (book viii.) from a specimen, as is conjectured, which Varro mentions as having been brought from Alexandria. Afterwards the giraffe became not unfrequent among the animals exhibited in the Roman games.* Oppian, who lived in the second century, notices this animal in the third book of his treatise on hunting. Gordian III., emperor of Rome from A.D. 239 to 244, is stated to have possessed ten of these animals. After the fall of the Roman empire we hear nothing of the giraffe for a considerable period. The first instance, after the darkness of the middle ages had passed, of a living giraffe in Europe, is that of one possessed by Frederick II., king of Germany (crowned 1215), which he received from the prince of Damas, now Damascus, and which was described by Albertus Magnus under the name of Anabula, with the synonyms Seraph, Oraflus, and Orasius.

Towards the end of the fifteenth century the Soldan of Egypt presented one of these animals to Lorenzo de' Medici, grand-duke of Tuscany: it was a great favourite with the inhabitants of Florence, and was accustomed to

* "Diversum confusa genus Panthera Camelo."
Horace, *Epist.* ii. 195.

walk about the streets, stretching its neck to the balconies and windows for fruits and other articles of food. Its picture exists in the frescoes of the Poggio Acajano, one of the duke's villas near Florence.

From this time no living giraffe was seen in Europe for nearly three centuries and a half; though in that space various descriptions and figures were published by writers on natural history, mixed up with abundant errors. Gesner, however, gives a tolerable account and figure in his 'Natural History,' published in 1551; Thevet, in his 'Cosmographia' (1575), describes and figures the giraffe; Bellonius, in his 'Observations' (1605), also figures it; Wolfgang, in his 'Historia Animalium Sacra,' mentions it; Topsell, in his 'History of Four-footed Beasts' (1607), describes it, and gives two figures; Leo Africanus and Ludolph both describe the giraffe, as does Johnston (cum figura) in his 'Quadrupeds.' We may also mention Alpinus ('Nat. Hist. Egypt'); and Carteret, whose paper read before the Royal Society is entitled 'Observations on a Camelopardalis found about the Cape of Good Hope.' (See 'Phil. Trans.' lx. p. 27.) Buffon describes and figures the giraffe, but in his drawings, as in those of all the preceding writers, the fore-legs are much too long. In the supplement (Supp. vol. vii.) the figure is improved, but still is not without faults. Vosmaer published in 1787, at Amsterdam, a quarto tract on this animal, with tolerable figures. It may here be noticed that, when the supplement to Buffon's great work was published, there was an adult female specimen in the museum of Paris, and M. Allemand of Amsterdam had also a young specimen.

Le Vaillant when in South Africa hunted the giraffe and procured some specimens; his description of the habits of the animal and his narrative of the incidents of the chase are interesting and graphic, but perhaps a little overcoloured. He says, "One of the Namaquas, who were my guides, came in great haste to give me information which he thought would be agreeable to me. He had seen the strong feeling of pleasure which I had

evinced at the sight of the skin of the giraffe; and he had run to say that he had just found in the neighbourhood one of these animals under a mimosa, the leaves of which he was browsing upon. In an instant, full of joy, I leapt upon my horse; I made Bernfry" (one of his men) "mount another, and, followed by my dogs, I flew towards the mimosa. The giraffe was no longer there. We saw her cross the plain towards the west, and we hastened to overtake her. She was proceeding at a smart trot, but did not appear to be at all hurried. We galloped after her, and occasionally fired our muskets; but she insensibly gained so much upon us, that, after having pursued her for three hours, we were forced to stop, because our horses were quite out of breath, and we entirely lost sight of her. . . . . The pursuit had led us far away from each other, and from the camp; and the giraffe having made many turns and doubles, I was unable to direct my course towards home. It was noon. I already began to feel hunger and thirst; and I found myself alone in a sterile and arid spot, exposed to a burning sun, without the least shelter from the heat, and destitute of food." The traveller, however, shot and cooked some birds of the partridge genus; and was fortunate to rejoin his companions in the evening. "The next morning my whole caravan joined me again. I saw five other giraffes, to which I gave chase; but they employed so many stratagems to escape, that, after having pursued them the whole day, we entirely lost them as the night came on. I was in despair at this ill success. . . . . The next day, the 10th of November, was the happiest of my life. By sunrise I was in pursuit of game, in the hope to obtain some provisions for my men. After several hours' fatigue we descried, at the turn of a hill, seven giraffes, which my pack instantly pursued. Six of them went off together; but the seventh, cut off by my dogs, took another way. Bernfry was walking by the side of his horse, but in the twinkling of an eye he was in the saddle, and pursued the six. For myself, I followed the single one at full speed; but, in

spite of the efforts of my horse, she got so much a-head of me, that, in turning a little hill, I lost sight of her altogether, and I gave up the pursuit. My dogs, however, were not so easily exhausted. They were soon so close upon her that she was obliged to stop to defend herself. From the place where I was I heard them give tongue with all their might; and, as their voices appeared all to come from the same spot, I conjectured that they had got the animal in a corner, and I again pushed forward. I had scarcely got round the hill, when I perceived her surrounded by the dogs, and endeavouring to drive them away by heavy kicks. In a moment I was on my feet, and a shot from my carbine brought her to the earth. Enchanted with my victory, I returned to call my people about me, that they might assist in skinning and cutting up the animal. Whilst I was looking for them, I saw Klaas Baster" (another of his men), "who kept making signals which I could not comprehend. At length I went the way he pointed, and, to my surprise, saw a giraffe standing under a large ebony tree, assailed by my dogs. It was the animal I had shot, who had staggered to this place; and it fell dead at the moment I was about to take a second shot.

"Who could have believed that a conquest like this would have excited me to a transport almost approaching to madness! Pains, fatigues, cruel privation, uncertainty as to the future, disgust sometimes as to the past—all these recollections and feelings fled at the sight of this new prey. I could not satisfy my desire to contemplate it. I measured its enormous height. I looked from the animal to the instrument which had destroyed it. I called and recalled my people about me. Although we had combated together the largest and the most dangerous animals, it was I alone who had killed the giraffe. I was now able to add to the riches of natural history: I was now able to destroy the romance which attached to this animal, and to establish a truth. My people congratulated me on my triumph. Bernfry alone was absent; but he came at last, walking at a slow pace, and holding

his horse by the bridle. He had fallen from his seat, and injured his shoulder. I heard not what he said to me. I saw not that he wanted assistance; I spoke to him only of my victory. He showed me his shoulder; I showed him my giraffe. I was intoxicated, and I should not have thought even of my own wounds."*

It is from this time that we may date our correct knowledge of this animal, of which several skins found their way from time to time into our island; that brought by Mr. Patterson, and ultimately deposited in the British Museum, being the first.† It was in the year 1827 that the first living giraffe visited our shores. The Pasha of Egypt destined four of these animals as presents to some of the European princes: of these, one died at Constantinople; one reached Venice, 1828; one was sent to Paris; and the fourth, which fell by lot to England, reached its destination safely in August, 1827, but died, worn out by illness, in 1829. Its preserved skin and skeleton were presented by George IV. to the Zoological Society, and now grace the museum of that Society.

In 1836 the arrival of four living giraffes at the gardens of the Zoological Society, procured in Kordofan by M. Thibaut, created a lively sensation in the world of science. From a letter of M. Thibaut to the secretary of the Zoological Society, in which he details his proceedings and manner of conducting the exhausting pursuit, we take the following extract:—"The first run of the giraffe is exceedingly rapid. The swiftest horse, if

* Second Voyage, tom. ii. p. 54.

† Mr. Patterson was sent to the Cape as botanist by Lady Strathmore, and he brought to this country the first entire skin of a giraffe on record. Lady Strathmore gave it to the celebrated John Hunter, in whose museum it was preserved. Afterwards the trustees of the Royal College of Surgeons transferred the skin to the British Museum. Its condition is very bad, the hair being almost all off the skin; yet, as a sort of historical monument in the department of Zoology, it is worthy of preservation.

unaccustomed to the desert, could not come up with it unless with extreme difficulty. The Arabs accustomed their coursers to hunger and to fatigue; milk generally serves them for food, and gives them power to continue their exertions during a very long run. If the giraffe reaches a mountain, it passes the heights with rapidity: its feet, which are like those of a goat, endow it with the dexterity of that animal: it bounds over ravines with incredible power; horses cannot, in such situations, compete with it. The giraffe is fond of a wooded country. The leaves of trees are its principal food. Its conformation allows of its reaching their tops. The one of which I have previously spoken as having been killed by the Arabs measured twenty-one French feet in height from the ears to the hoofs. Green herbs are also very agreeable to this animal; but its structure does not admit of its feeding on them in the same manner as our domestic animals, such as the ox and the horse. It is obliged to straddle widely; its two fore-feet are gradually stretched widely apart from each other, and, its neck being then bent into a semicircular form, the animal is thus enabled to collect the grass. But, on the instant that any noise interrupts its repast, the animal raises itself with rapidity, and has recourse to immediate flight. The giraffe eats with great delicacy, and takes its food leaf by leaf, collecting them from the trees by means of its long tongue. It rejects the thorns, and in this respect differs from the camel. As the grass on which it is now fed is cut for it, it takes the upper part only, and chews it until it perceives that the stem is too coarse for it. Great care is required for its preservation, and especially great cleanliness. It is extremely fond of society, and is very sensible. I have observed one of them shed tears when it no longer saw its companions or the persons who were in the habit of attending to it." ('Proceeds. Zool. Soc.,' 1836.) (Fig. 43.)

The efforts made by the spirited agent of the Zoological Society in Nubia, and the success of his arrangements for the transport of the animals from the interior

43.—Giraffe.

to the coast, not only encouraged others to make a similar attempt, but opened the way for them in which to proceed; and subsequently other living specimens were sent to Malta, and thence to England, so that at one time there were seven giraffes in London.

The giraffe with due care endures our climate well; the female in the gardens of the Zoological Society has bred twice; the first fawn died, but the second, which grew rapidly, is in excellent health and condition.

The giraffe, as its figure, the mobility of the lips, and the prehensile power of the tongue declare, is formed for browsing on the leaves of trees, those of the mimosa being especially relished. The first giraffe which Le Vaillant saw was under one of these trees, on the leaves of which it was making a repast: with his characteristic enthusiasm he began the pursuit, as he has detailed in the passage given at page 88. This one escaped him, but subsequently, as we have seen, he was more successful.

We have already alluded to the difficulty which the giraffe experiences in putting its lips to the ground, being obliged to set its fore-limbs wide apart; it is indeed an action which it seldom attempts unless induced by some tempting morsel, as, for instance, sugar, of which the giraffes in the gardens of the Zoological Society are very fond, and for which they will follow their attendants, trying to gain possession of it by insinuating their long slender tongue or upper lip into the hands of the person who holds it. In their play we have several times noticed that they strike out with the fore-limbs, and these, as well as the hind-limbs, they use in self-defence, lashing out with rapid and impetuous force. "His defence," says Le Vaillant, "consists in kicks, and his hinder limbs are so light and his blows so rapid, that the eye cannot follow them;" and "I know beyond a doubt that by its kicking it often tires out, discourages, and even beats off the lion." After his dogs had brought an individual to bay, they dared not make an attack, as it defended itself "with a succession of rapid kicks." Major Gordon notices the force with

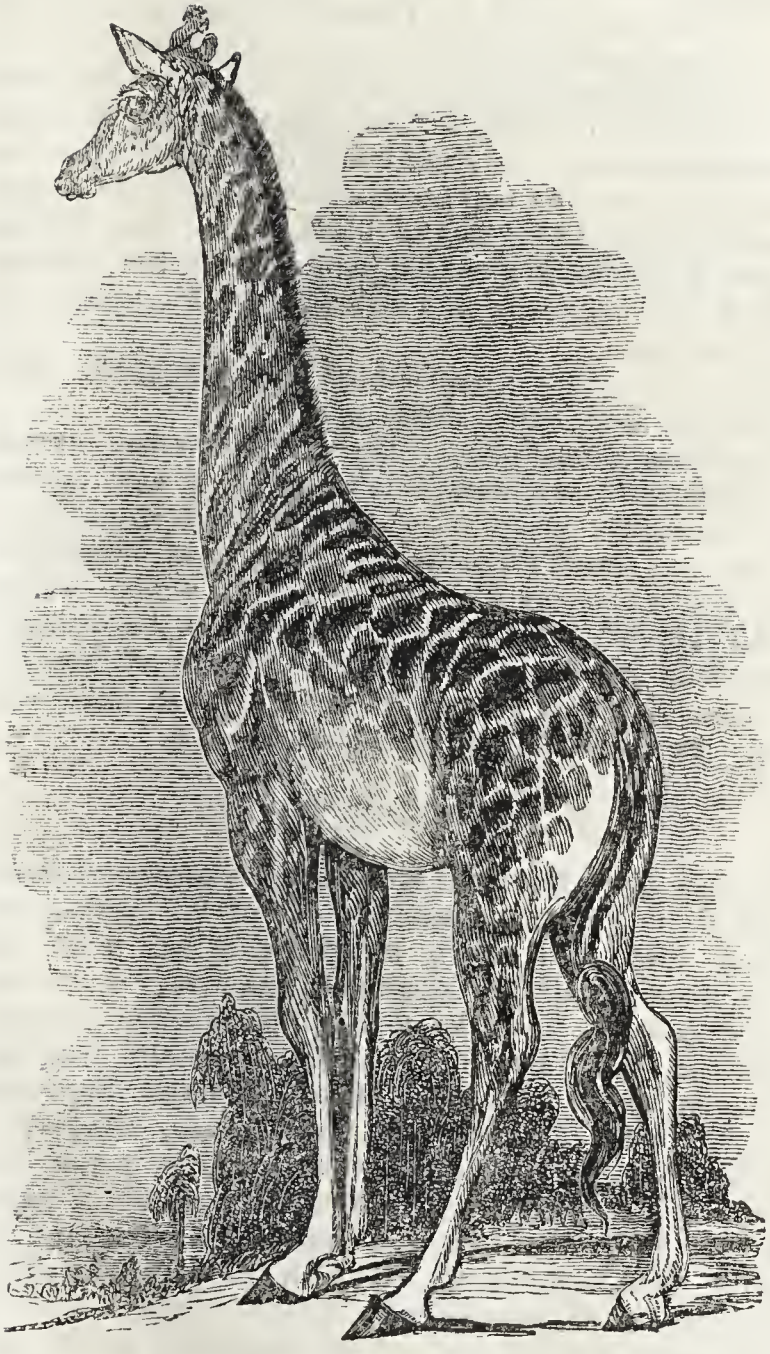
which one which he killed spurned the ground in the agony of death.

Le Vaillant observes that the giraffe never uses its horns in resisting any attack; we have, however, often seen the gentle and beautiful animals in the gardens of the Zoological Society, while playing with each other, swing the head round and butt with the horns; but in earnest self-defence we may easily believe that this mode would never be adopted. While speaking of these individuals, we may state that they often take each other's mane between the lips, and appear to nibble it as they pass their mouth along its course. They are extremely confiding in disposition: the presence of strangers is far from giving them annoyance; they gaze with calmness on the crowd of admirers around them, and bend their necks down as if to contemplate them more closely, or in order to solicit some delicacy.

In its native wilds, man excepted, the lion is the only enemy to be feared by the giraffe; and from various sources we learn the lion often surprises the latter when he comes to drink at the pools or fountains, and springs from his ambush upon the tall and powerful beast, which, mad with terror and pain, rushes over the desert, bearing the "great destroyer," till, strength failing, he reels, sinks, and expires.

According to M. Thibaut, the Arabs of Nubia are very fond of the flesh of the giraffe; and he himself, partaking of the repast (viz. broiled slices), found it to be excellent. In South Africa its flesh is equally acceptable.

The height of the male giraffe to the top of the head is from fifteen to sixteen feet, of the female from thirteen to fourteen. The general colour is fawn-white, marked regularly with large angular spots of chocolate-brown, compacted rather closely together; the throat and legs are white; the tuft at the end of the tail black; the hair is close and glossy. (Fig. 44.) The South African variety is generally darker than the Nubian. The specimens presented by Mr. Burchell to the British Museum came from Kosi Fountain, and of these the female is



44.—Giraffe.

lighter coloured than the male. A specimen from Central Africa, presented by Colonel Denham, is young, and the spots are fawn-coloured on a white ground.

In the Museum at Paris is a very young giraffe, about four feet seven or eight inches in total height, of a uniform mouse-colour, the hair being remarkably close and fine, resembling the nap of velveteen; the place of each horn is indicated by a tuft of black hairs. The Nubian giraffes in the Zoological Gardens differ in the intensity of their colour, one of the males being of a lighter tint than the other.

The period of gestation is about sixteen months. (See 'Proceeds. Zool. Soc.,' 1839, p. 108.)

In a state of confinement the giraffe eats hay, carrots, and onions, to the latter of which it is very partial. We have never heard these animals utter any noise or cry, nor do travellers make any mention of their voice. The giraffe shot by Colonel Gordon, to which we have already alluded, when so wounded as to be incapable of rising from the ground, exhibited no signs of anger or resentment, nor is it stated to have made any moan. Hence we conclude that the giraffe is mute.

Family—MOSCHIDÆ.

Linnæus gave the title *Moschus* to a group of Ruminants, from the circumstance of one of the species producing that well-known substance called musk, the secretion of a peculiar glandular pouch in the abdomen of the male, for the sake of which the animal is eagerly hunted in the regions it frequents, namely, the high mountain-ranges in China, Thibet, Tonquin, Pegu, and also Southern Tartary. The musk-deer, however, is the only known species of this group in which this secretion is produced. The Moschidæ closely resemble the deer in general form and appearance; but they resemble them in miniature, for, with the exception of the true Musk (*M. moschiferus*), which equals a roebuck in size and stature, the rest are extremely small, some not exceeding a hare in magnitude. They are extremely

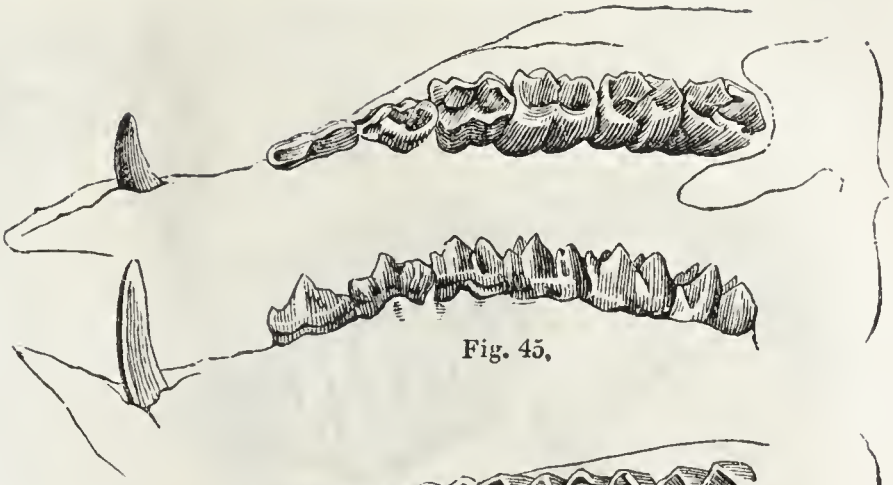


Fig. 45.

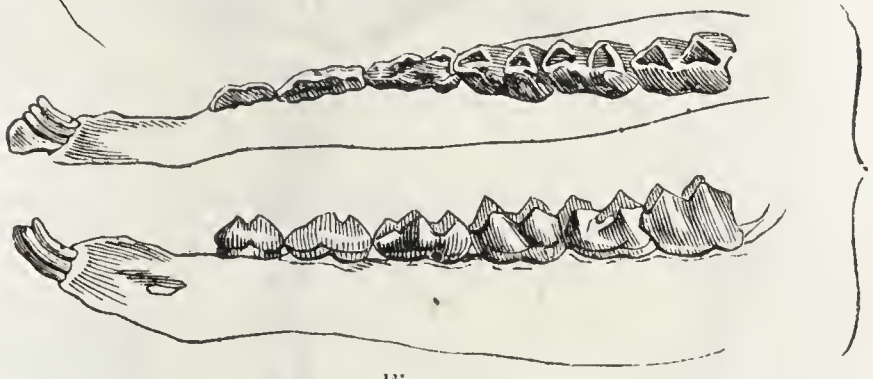


Fig. 46.

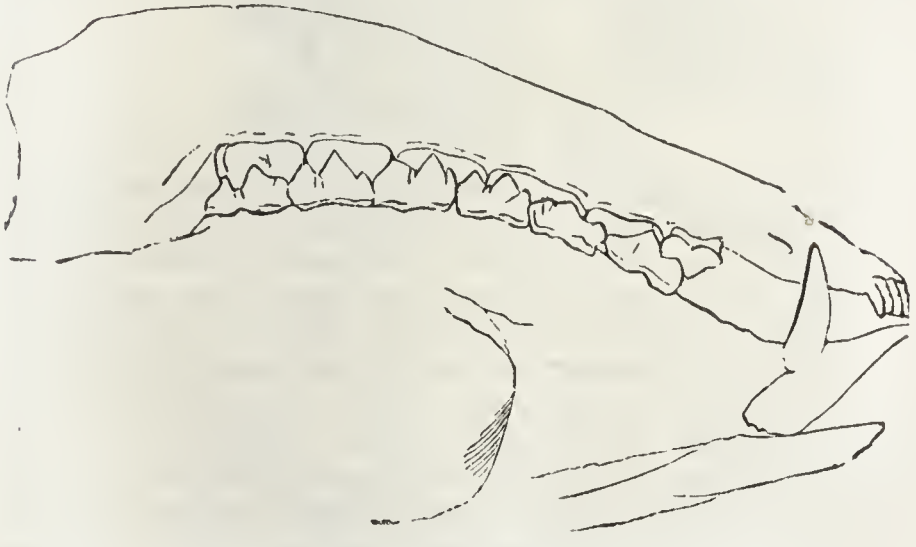
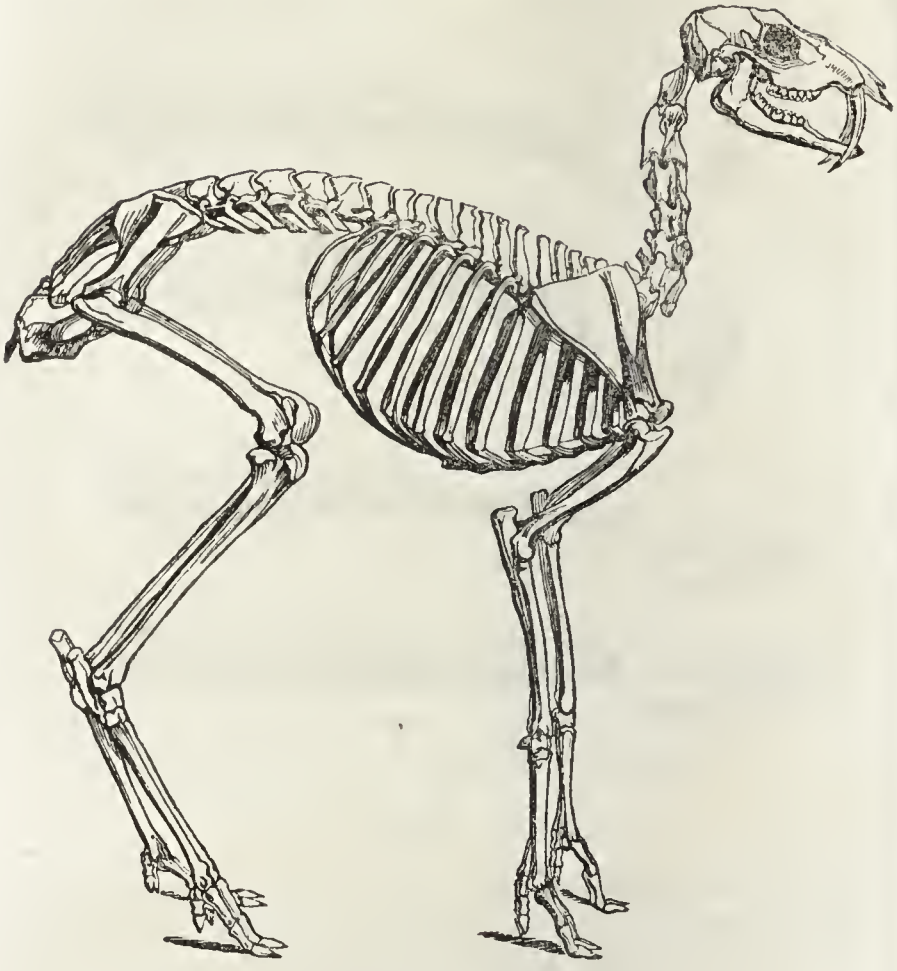


Fig. 47.

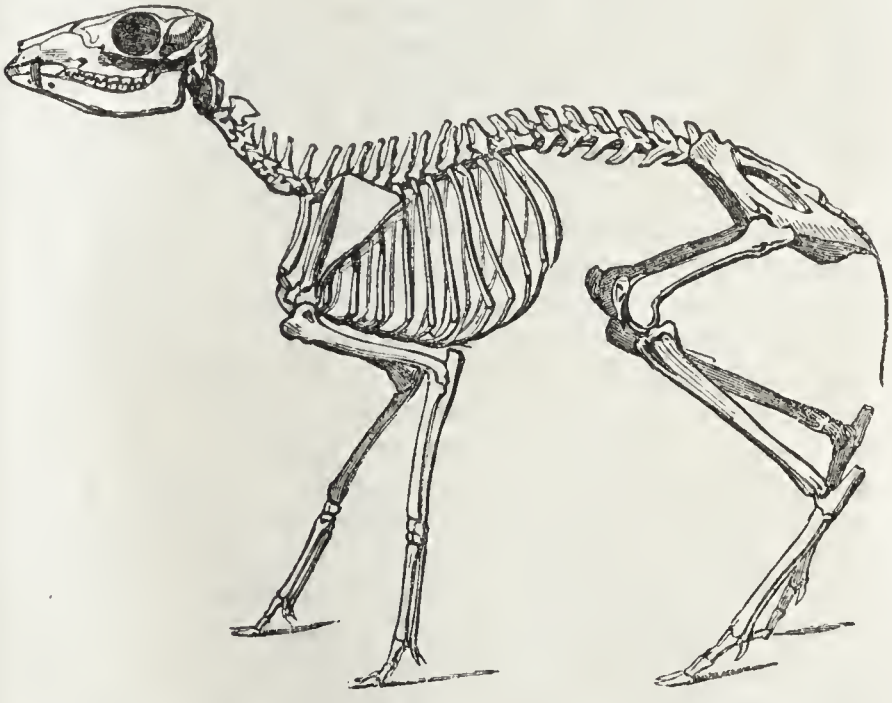


48.—Skeleton of Musk-Deer.

beautiful: the eyes are large, dark, and beaming with a mild and animated expression; the head is small and tapers to a slender muzzle; the ears are moderate and open; the haunch elevated and round; and the limbs delicately slender and tapering to narrow-pointed hoofs. The family characters consist in the absence of horns, and also of suborbital sinuses (pits beneath the inner angle of the eye), so conspicuons in many of the deer and antelopes. The muzzle is naked. There are long canines in the upper jaw of the males, projecting downwards, and coming out from between the lips. These

canines are compressed, pointed, arched backwards, and have a sharp posterior cutting edge. In the true musk they are at least three inches in length. The crowns of the molars are acutely tuberculated. Fig. 45 represents the teeth of the upper jaw in two views; Fig. 46, those of the lower; Fig. 47, a lateral view of teeth of both jaws together. Besides the two toes united to a single canon-bone, as usual, there are two accessory toes on each foot, each of which has its own slender metatarsal or metacarpal bone. See Fig. 48, the skeleton of the *Moschus moschiferus*, and Fig. 49, the skeleton of the *Meminna*, which are excellent illustrations of their osteology. There are no horns or antlers, nor even their rudiments.

Mr. Gray divides the Moschidæ into three genera, viz. *Moschus*, *Meminna*, and *Tragulus*. The last title, however, is applied by Mr. Ogilby to a species of antelope (*A. pygmæa*). Most authors, moreover, adopt the Linnæan genus Moschus, and we shall in this instance



49.—Skeleton of Meminna.

follow their example. Setting aside the true musk, the other members of the genus are termed Chevrotains, and till very recently were supposed to be respectively restricted to Java, Sumatra, Ceylon, and perhaps other adjacent islands: recently, however, to the surprise of naturalists, a species has been discovered in Sierra Leone, to which, from its aquatic habits, Mr. Ogilby has given the title of *Moschus aquaticus*. (See 'Proceeds. Zool. Soc.' 1840, p. 35.)

The Musk-Deer (*Moschus moschiferus.*)

The musk-deer, unlike its relatives which tenant the forests of Ceylon and Java, &c., inhabits the great mountain-range which belts the north of India, and branches out into Siberia, Thibet, and China, through a vast extent of which it ranges, preferring the bold precipitous crags and wild rocks on the borders of the line of snow to the valleys or the lower elevations. It is common to Nepal, Boutan, Thibet, and the adjacent districts of China. It also abounds in the Altaic range near Lake Baikal, where it was observed by Pallas on the mountains of Kouznetzk, near the lake Telet Koi. The texture and thickness of the fur of the musk-deer sufficiently demonstrate the animal to be the native of a cold and elevated region. The fur is not only full and long, but presents that peculiar harsh or rigid and inelastic texture which we observe in the chamois, or rather in the klip-springer of the mountains of South Africa. Instead of lying flat on the skin it grows erect, and is so closely set as to form a dense substantial covering. Common as is the musk-deer in the great alpine ranges of Asia, nevertheless it does not appear to have been known to the ancients, a circumstance doubtless to be attributed to the almost inaccessible nature of the regions it frequents. Neither Aristotle nor Pliny mentions either the animal or its celebrated produce. It is from the male only that the drug and perfume termed musk is procured; it is the unctuous secretion of a certain glandular pouch, and when dry it becomes dark brown or

black, and somewhat granular. Its peculiar odour is well known. Formerly it was in high repute for its medicinal qualities, and still holds a place as an antispasmodic in the Materia Medica. It was first, as we learn, introduced into the practice of medicine among the Arabians, by whose writers the animal producing it is first distinctly mentioned, having, as Daubenton states, been described by Serapion in the eighth century: but we know not the time when this article first found its way to Europe; probably after the early Crusades. In Boutan, Tonquin, Thibet, &c., it appears from time immemorial to have been used as a medicine and perfume, and to have formed an article of trade amongst the inhabitants of those countries. Abusseid Scrafi describes the musk-deer as an animal resembling the roe, but erroneously assigns to it horns, in which error he is followed by Aldrovandus. Among other Arabian writers who notice this animal is Avicenna, who refers to its musk-pouch and large bent canines. Kircher ('La Chine illustrée,' transl. Franc., 1610) gives an account of the musk-deer which is found in the provinces of Xensi and Chiamsi: he quotes several details respecting it from the Chinese Atlas, whence we learn that the Chinese term it Xe, which means odour; that its flesh is accounted delicate; and that it abounds in the provinces of Suchuen and Junnan. In some districts the musk-deer is very common, and multitudes are slaughtered for the sake of their costly perfume; which, however, is always greatly adulterated. To the practice of adulterating it the celebrated merchant-traveller Tavernier alludes, adding that the odour of the substance when recent is so powerful as to cause the blood to gush from the nose. Chardin says, "It is commonly believed that, when the musk-sac is cut from the animal, so powerful is the odour it exhales, that the hunter is obliged to have the mouth and nose stopped with folds of linen, and that often, in spite of this precaution, the pungency of the odour is such as to produce so violent an hæmorrhage as to end in death. I have," he adds, "gained accurate information respecting this circumstance; and as

I have heard the same thing talked of by some Armenians who had been to Boutan, I think that it is true. The odour is so powerful in the East Indies, that I could never support it; and when I trafficked for musk, I always kept in the open air, with a handkerchief over my face, and at a distance from those who handled the sacs, referring them to my broker; and hence I knew by experience that this musk is very apt to give headaches, and is altogether insupportable when quite recent. I add, that no drug is so easily adulterated, or more apt to be so."

These accounts must be taken, we suspect, with some allowance. Certain it is that, when procured in Europe, in the ordinary way of commerce, it produces no such violent effects. It must be confessed, however, that before arriving in Europe not only much of its strength is lost, but it has undergone several adulterations.

Tavernier states that the musk-deer is very numerous in 60° N. lat., among the wooded mountains, whence in February and March, when the snows have deeply covered the earth, hunger drives them southward into the lower lands, to 44° or 45° N. lat., in search of herbage. At this season the peasants wait for them on their passage, and catch them in snares, or kill them with clubs and arrows. At Patana he bought on one occasion 1673 musk-bags, weighing 2557½ ounces, and of pure musk 452 ounces.

In size the musk-deer is about equal to our European roebuck, standing two feet in height at the shoulders; the forehead is arched, the eyes large, the ears rather ample, and very moveable; the tail is a mere rudiment, concealed by the long, harsh, and almost spine-like hair with which the animal is universally covered. The general contour is compact, and displays great vigour, the limbs being robust, and well adapted for climbing and leaping among the rocks of the mountain-ranges. The hoofs are strong, broad, and expanded; and the posterior rudimentary hoofs are so developed as to touch with their points the surface on which the animal treads, so as to add to the security of its footing. (Fig. 50.)

50.—Musk-Deer.

The general colour of the musk-deer is brown, washed with gray and pale yellow, each hair being tipped with ferruginous; obscure gray or whitish marks often occur on the sides, especially in immature individuals; the shoulders and limbs are of a deeper tint than the body.

The female is less than the male, and is destitute of tusks or long canine teeth, and of a musk-sac. The teats are two in number. In its manners the musk-deer resembles the chamois: its favourite haunts are the pine-forests on the mountains, and its agility is very great, enabling it to spring from rock to rock with great ease and address. It is extremely wild and shy, and is said to be cautious and watchful against surprise, taking refuge, when pursued, among the crags and precipices of the more elevated peaks of the ranges it tenants; yet,

in despite of all its vigour and shyness, it falls a sacrifice to the energy and the contrivances of man.

In 1772 a male of this species was living in the park of Mons. de la Vaillière, at Versailles, in France; and Daubenton, who published a description of it, informs us that the odour it exhaled, and which was carried by the wind, was quite sufficient to guide to the spot where the animal was kept enclosed. "When I first saw it," he adds, "I recognised much resemblance in its figure and attitude to those of the roe, the gazelle, and the chevrotain. No animal of this (the deer) tribe has more activity, suppleness, and vivacity in its movements." It was extremely timid and wild; but, like all the species of the peculiar group to which it belongs, it is gentle and inoffensive. The chevrotains, as we well know, may be rendered very tame: and it is probable that if the musk-deer were taken while young, it might be easily domesticated, since the former animals are shy and timid in the extreme while in a state of natural freedom, but soon gain confidence, and have even bred in captivity in our uncongenial climate.

A good figure of the musk-deer is given by Buffon in the 6th vol. of his Supplement.

The Meminna (*Moschus meminna*).

This elegant little species is a native of Ceylon and Java, and is also found in considerable numbers in the dense woods of the Western Ghauts (but never on the plains), where it was seen by Colonel Sykes, who observes, that it readily reconciles itself to confinement: the flesh is excellent eating. In size it exceeds a large hare, being about one foot five inches long, and eight inches high. Its colour is olive-gray, spotted and streaked on the sides and haunches with white; the ears are large and open; the tail is very short. (Fig. 51.)

The Napu (*Moschus Javanicus*).

The species, constituting the little section of which the Napu is a representative, are characterised by having the

51.—Meminna.

hinder edge of the metatarsus bald and slightly callous; the throat is provided with a somewhat naked concave subglandular callous disc, from which a band extends to the fore part of the chin; and most of them have three diverging bands of white on the chest. The animals of this group are distinguished by their beauty and diminutive size, the largest not equalling a hare. Their limbs are very slender and delicate; their hoofs are long and narrow; the muzzle is acute; the eyes large and dark; the ears pointed. (Fig. 52.)

The species are enveloped in some degree of confusion; indeed they resemble each other so closely, that it requires some attention to discriminate between them. Mr. Bennett, who investigated these animals with the

greatest care, considered that three species were definable, viz. the Napu, the Kanchil, and the Pelandok; the former two of which are described by Sir T. S. Raffles, in the 'Linn. Trans.' vol. xiii. Mr. Gray considers the Pelandok to be in all probability identical with a species described by him under the specific title of *Rufiventer*, and adds another species to the group under the designation of *Stanleyanus:* of this species a pair bred in the gardens of the Zoological Society.

52.—Napu.

The napu is a native of Java and Sumatra, and is the largest of this section; its colour is ferruginous brown above and white beneath, the chest having two longitudinal dusky stripes, so as to produce a central and two diverging lateral lines of white, below which passes a transverse band of pale yellowish fawn. The muzzle, which is naked, is black, with a tinge of flesh colour, as are the ears, which are also nearly naked. The tail is rather short, and white at the tip. In its native regions

the napu gives preference to thickets and districts overgrown with brushwood, near the sea-shore, and feeds principally on the berries of a species of *ardisia*. It is said to be inferior to the kanchil in speed, activity, and cunning, and is therefore more exposed to danger from the assaults of wild beasts, which abound in the forest; and hence it prefers to lurk in coverts near the vicinity of man, from whose observation it can more easily conceal itself than from the watchful eyes of the feline race.

In its manners the napu is mild and gentle, and soon becomes reconciled to captivity: it bears our climate well, with care; though destitute of marked intelligence, its graceful form, agreeable colouring, and full dark eyes render it an interesting object.

The Kanchil (*Moschus kanchil*, Raffles).

The kanchil is lighter in form and more spirited than the napu, and considerably smaller. Independent of the difference in size, it is easily distinguished by its darker colour, by a broad stripe of dark chestnut verging upon black which runs down the back of the neck, and by the width of the band across its chest. (Fig. 53.) Of all the chevrotains this is the most active and elegant; indeed its address and resolution are the common theme of discourse in Java, its native country; and the most extraordinary instances are related of its cunning. Unlike the napu, it resides in the depths of the mighty forests which cover so large a portion of the island, feeding chiefly on the fruit of the kayo-briang (*Gmelina villosa*): and though it will live in confinement, it endures captivity with great impatience and restlessness, availing itself of the first opportunity of escape that offers, when it bounds away for the forest, the deep recesses of which afford it a welcome refuge. Such are its cunning and alertness, and so prompt is it with expedients when pressed by danger, that, as Sir S. Raffles informs us, "it is a common Malay proverb, to designate a great rogue to be as cunning as a kanchil;" and he adds, of this cunning many instances are related by the natives.

"If taken in a noose laid for it, the kanchil, when the hunter arrives, will stretch itself out motionless, and feign to be dead; and if, deceived by this manœuvre, he disengage the animal, it seizes the moment to start on its legs and disappears in an instant. A still more singular expedient is mentioned, viz. that, when closely pursued by dogs, the kanchil will sometimes make a bound upwards, hook itself on the branch of a tree by means of its bent tusks, and there remain suspended till the dogs have passed beneath." In vigilance, activity, and cunning, if these statements be but partially true, the kanchil surpasses the rest of the group; none indeed, excepting this, have gained a reputation for these qualities, though all are light-limbed, free, and vigorous.

53.—The Kanchil.

Among the species to be erased from the genus Moschus, are the Guevi, or pigmy antelope, of Senegal (*Antelope pigmæa*), regarded by Buffon as a chevrotain; and the *Moschus Americanus* and *M. delicatulus* of

South America, which are the young of one of the deer of that country. The *Moschus pigmæus*, Linn., is the young of an antelope. The *Moschus guineensis*, Brisson and Gmelin, is also most probably the young of an antelope. As we have said, however, Africa produces one species at least of the genus Moschus, of which a perfect skin and skeleton are in the museum of the Zoological Society of London.

The African musk-deer (*Moschus aquaticus*, Ogilby, 'Proceeds. Zool. Soc.' 1840, p. 35) very much resembles the meminna, but is larger, being about midway in size between that species and the *Moschus moschiferus*. Its general colour is a deep rich brown, with white spots and markings, nearly similar to those of the meminna, but with the throat-marks as in the napu or kanchil. This interesting species is a native of Sierra Leone, where it lives on the borders of rivers, and takes freely to the water.

CERVIDÆ, OR THE DEER TRIBE.

The animals of this great group, celebrated for their beauty, vigour, and speed, are spread very extensively, each quarter of the globe having its own peculiar species. To this universality of distribution there are, however, certain exceptions: none are found in Australia, and none in the southern and central regions of Africa, their place in the latter regions being supplied by the giraffe and hosts of antelopes. Hills of moderate elevation, wide plains, and forests, are the localities to which these fleet-limbed creatures give preference; none tenant the peaked ridges of the mountain-top, where the chamois and musk-deer find a congenial abode. They delight in a wide range of country, and trust to their swiftness of flight for safety. Most herd together in troops; some few live singly. It may be observed that, in general, their body is round and stout; their limbs long, sinewy, and powerful; their neck long, but very muscular; their head small, and carried high; their eyes large and full; their ears ample.

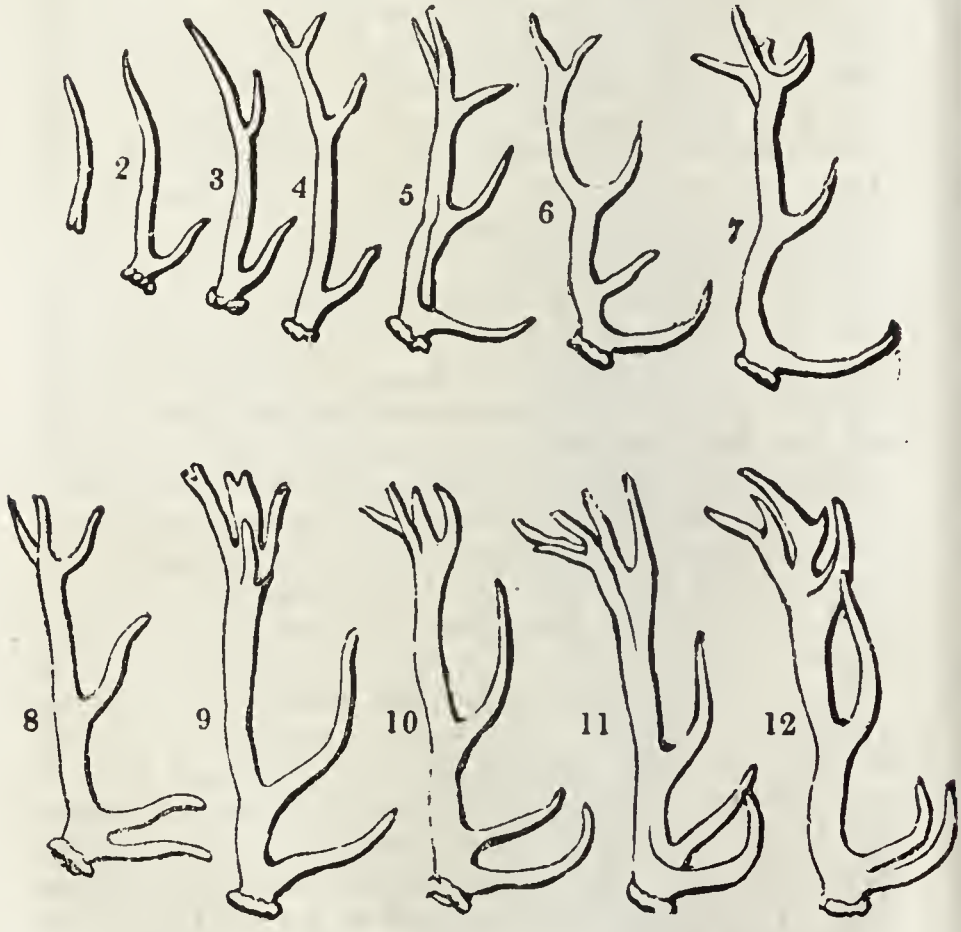
Many species have suborbital sinuses (or lachrymal sinuses), but not all. With respect to these sinuses, or fissures below the eyes, in so many both of the deer and antelopes, we may here remark that their use is not understood: they have nothing to do with respiration, being mere follicles or pits in the skin, having no communication with the interior of the nasal passages. They secrete a peculiar unctuous fluid, exuding more abundantly at certain seasons than at others, when their edges become very tumid, and are incapable of being closed together, as at other times. The animals often apply them to objects near them, widely opening them at the same moment, which they do also when irritated or under excitement. In several species they are greatly developed, and no doubt serve some important purpose in the animal economy. In most species the muzzle, which is small, is flat and naked; in some, as the elk and reindeer, it is large and hairy, and the upper lip is prehensile. The females have four teats.

Throughout all the species the males are furnished with antlers, commonly called horns, which are lost and renewed yearly, increasing in size, and the number of their branches, at each renewal until a certain period. They are seated upon an osseous peduncle or footstalk rising from each frontal bone, at its central point of ossification: these peduncles are enveloped in skin. It is not till the spring or beginning of the second year that the first pair of horns begin to make their appearance. At this epoch a new process commences; the skin enveloping the peduncles swells, its arteries enlarge, tides of blood rush to the head, and the whole system experiences a fresh stimulus. The antlers are now budding, for on the top of these footstalks the arteries are depositing layers of osseous matter, particle by particle, with great rapidity; as they increase the skin increases in an equal ratio, still covering the budding antlers, and continues so to do until they have acquired their due development and solidity. This skin is a tissue of blood-vessels, and the courses of the large arteries from the head to the end of the antlers are imprinted on the

latter in long furrows, which are never obliterated. In ordinary language, the skin investing the antlers is termed velvet, being covered with a fine pile of close short hair. Suppose, then, the antlers of the young deer now duly grown, and still invested with this vascular tissue; but the process is not yet completed. While this tender velvet remains the deer can make no use of his newly-acquired weapons, which are destined to bear the brunt of many a conflict with his compeers: it must therefore be removed, but without giving a sudden check to the current of blood rolling through this extent of skin, lest, by directing the tide to the brain, or some internal organ, death be the result. The process then is this:—as soon as the antlers are complete (according to the age of the individual), the arteries at their base, where they join the permanent footstalk (always covered with skin), begin to deposit around it a burr, or rough ring of bone, with notches, through which the great arteries still pass. Gradually, however, the diameter of these openings is contracted by the deposition of additional matter; till at length the great arteries are compressed as by a ligature, and the circulation is effectually stopped. The velvet now dies for want of the vital fluid; it shrivels, dries, and peels off in shreds, the animal assisting in getting rid of it by rubbing his antlers against the trees. They are now firm, hard, and white; and the stag bears them proudly, and brandishes them in defiance of his rivals. From the burr upwards, these antlers are now no longer part and parcel of the system; they are extraneous, and held only by their mechanical continuity with the footstalk on which they were placed: hence their deciduous character, for it is a vital law that the system shall throw off all parts no longer intrinsically entering into the integrity of the whole. An absorbent process soon begins to take place just beneath the burr, removing particle after particle, till at length the antlers are separated and fall by their own weight, or by the slighest touch, leaving the living end of the footstalk exposed and slightly bleeding. This is immediately covered with a pellicle of skin, which soon thickens, and all is well. The return of

spring brings with it a renewal of the whole process with renewed energy, and a finer pair of antlers branches forth.

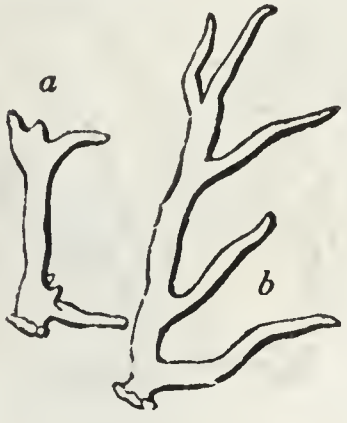
The common stag begins to acquire his antlers in the spring, and loses them early in the spring succeeding. His first antlers (second spring) are straight, small, and simple: he is now termed a Brocket. The next pair are larger, and have a brow antler directed forwards from the main stem, sometimes with one or two small branches above. The third pair of antlers has two forward stem branches besides the brow antlers, and one or two snags at the top: the fourth pair have the brow



54.—Stags' Horns.

and stem antlers increased, and more snags: the fifth and sixth pairs exhibit still greater development, and an increase in the number of snags. Any disturbance in the system produces a corresponding deterioration in the form and proportions of the horn. Our figures develop the progress of the successive annual horns in the stag or red-deer, and in the fallow-deer. The horns are from the left side.

Fig. 54 (Stag):—1, Horn of first growth; 2, 3, 4, ditto of second; 5, 6, of third and fourth; 7, of fifth; 8, 9, of the sixth growth; 10, 11, 12, the seventh and subsequent growths; the horns being at their maximum. Fig. 55 represents horns of the Wapiti-deer: *a*, horn



55.—Horns of Wapiti.

produced in unfavourable circumstances, in confinement; *b*, horn of the same animal the year afterwards, and finely branched. Fig. 56 (Fallow-deer):—1, Horn of the first growth; 2, 3, 4, horns of the second; 5, 6, 7, horns of the third; 8, 9, horns of the fourth; 10, 11, 12, 13, horns of the fifth and sixth growth. Fig. 57 shows the horns of a fallow-deer in an unnatural state, and not shed at the proper time (*Cervo evirato*).

The Cervidæ are divided by Col. Hamilton Smith into the following sections, which many naturalists have adopted, and which seem to us very natural. 1. *Alce*, or the Elk group; 2. *Rangifer*, or the Rein-deer group;

56.—Horns of Fallow-Deer.

3. *Dama*, or the Fallow-deer group; 4. *Elaphus*, or the Stag group; 5. *Rusa*, or the Sambur-deer group; 6. *Axis*, or the Axis-deer group; 7. *Capreolus*, or the Roebuck group; 8. *Mazama*, or the American Fallow group; 9. *Sabulo*, or the Guazu or Brocket group of America; 10. *Styloceros*, or the Muntjacks.

57.—Horns of Fallow-Deer.

1. Alce.—*Horns sessile, more or less subdivided, without either basilary or mesial antlers, but terminated by a vast palmation, digitated on its external border only.*

The American Elk, or Moose-Deer

(*Alces Americanus; Cervus alces*, Linn.).

The elks are the largest of the Cervidæ, and are distinguished by the broad palmation of their antlers,

58.—American Elk.

furnished with numerous digitations on their outer edge only; a large isolated branch springs from the stem, which latter is thick and short, and begins immediately to expand; the head is heavy, the ears large and open, the eyes small and dull; the muzzle elongated, thick, projecting, pendulous, and flexible—it is covered with hair. Two small pendulous dewlaps of loose skin hang from the throat; the neck is short and thick, the body strong and short; the limbs are long and awkward; the toes are broad, and divided so high that they diverge as the animal presses them to the ground; the tail is extremely short; the hair is full, harsh, long, and produced on the neck and shoulders into a mane. (Fig. 58.)

It has been considered by many naturalists that the American elk and the European elk are specifically

identical; it is probable, however, that they are distinct. The European elk is spread but thinly through the wild forest-regions of Norway, Sweden, part of Prussia, Lithuania, and Russia, from the fifty-third to the sixty-third degree of north latitude. It extends also through Asiatic Tartary to the north of China. Buffon supposes that the Greeks were unacquainted with this animal, and it does not appear to have been noticed by Aristotle. That it was the Alce or Alees, of Pausanias, Cæsar, and Pliny, there can be no doubt. The word Alce or Alehis is merely the Celtic Elch or the Scandinavian Ælg modified. In book viii. ch. xvi. Pliny gives an account of the alce, which he distinguishes from the alchis, regarding them at the same time as allied animals: but it is easy to see through his error; his account of its walking backwards while feeding, in consequence of its overhanging lip, and his statement that there is no joint at the hock, we need scarcely say are fabulous. According to Mr. Lloyd ('Field-Sports of the North of Europe') the elk is far less common than formerly, and restricted to certain districts only. It frequently attains the height of seven and even eight feet, but does not attain to full growth till about the fourteenth year. A young elk two years old, in the possession of Mr. Wise, the Swedish consul-general, measured upwards of six feet at the shoulder. Mr. Lloyd thus describes the habits and uses of the European elk:—"The elk is a long-lived animal; he does not attain to his full growth until after his fourteenth year. At least so it is to be presumed, as up to that period his horns, which are of a flat form, are annually provided with an additional branch. He sheds his horns about the month of February in each year. The female elk, unlike the rein-deer of that sex, has no horns. The horns of the young male elk are perceptible nine months after its birth: for the first year they are cylindrical and short; the second year they are about a foot in length, but not branched; the third year two points are discernible; the fourth year, three; the fifth, they are full grown in length. From that time forward they yearly increase in breadth, and in the number of branches, until

there are as many as fourteen on each horn. By nature," adds Mr. Lloyd, "the elk is timorous, and he usually flies at the sight of man. At certain seasons, however, like other animals of the deer kind, he is at times rather dangerous. His weapons are his horns (Fig. 59) and hoofs; he strikes so forcibly with the latter as to annihilate a wolf or other large animal at a single blow. It is said that when the elk is incensed the hair on his neck bristles up like the mane of a lion, which gives him a wild and frightful appearance. The usual pace of the elk is a high shambling trot, and his strides are immense, but I have known him, when frightened, to go at a tre-

59.—Horns of Moose-Deer.

mendous gallop. In passing through thick woods he carries his horns horizontally, to prevent them from being entangled in the branches; from the formation of his hoofs, he makes a great clattering, like the rein-deer, when in rapid motion. In the summer season the elk usually resorts to morasses and low situations; for, like other animals of the deer kind, he frequently takes to the water in warm weather; he is an admirable swimmer. In the winter time he retires to the more sheltered parts of the forest, where willow, ash, &c., are to be found, as from the small boughs of these trees he obtains his sustenance during that period of the year. In the summer and autumn the elk is often to be met with in small herds,

but in the winter there are seldom more than two or three in company. At the latter season, indeed, he is frequently alone. The flesh of the elk, whether fresh or smoked, is very excellent: the young are particularly delicious. The tongue and the nose are thought to be great delicacies in Scandinavia as well as in America. Great virtue was once placed in the hoof of that animal; but this idle notion must, by this time, I should think, be nearly exploded. The skin is convertible to many purposes, and is very valuable." Mr. Grieff says, "It is not long since that a regiment was clothed with waistcoats made from the hides of those animals, which were so thick that a ball could scarcely penetrate them." "The elk is easily domesticated. Formerly these animals were made use of in Sweden to draw sledges, but, owing, as it was said, to their speed frequently accelerating the escape of people who had been guilty of murders or other crimes, the use of them was prohibited under great penalties. Though I apprehend these ordinances, if not abrogated, are obsolete, I am not aware that the elk is ever made use of in that kingdom at the present day, either to draw a sledge or for other domestic purposes. In Sweden, it is contrary to law at this particular time to kill the elk at any season of the year: this is not the case in Norway; for in that country, these animals may be destroyed, with certain limitations as to numbers, from the 1st of July to the 1st of November inclusive. The penalty however for killing an elk out of season, in Norway, is very much heavier than in Sweden; it amounts indeed, including legal expenses, &c., to about 20*l*., which is no inconsiderable sum in that kingdom." (Lloyd, 'Field-Sports of the North of Europe,' vol. ii., p. 329 et seq.)

Immediately following the passage above quoted there is a very interesting account of the mode of hunting the elk in Scandinavia, upon "skidor," or snow-skates, interspersed, as most of such narratives are, with notices of the habits of the animal; but as our limits will not permit its insertion, we refer the reader to the work. which is well worthy of his attention.

60.—Moose-Deer.

The American elk, or moose-deer (Mousöa of the Crees; Mongsoa of the Algonquins; Denyai of the Chippewyans), presents the same habits and manners as the elk of Scandinavia. (Fig. 60.) Formerly its range was more extensive than at present. Dr. Richardson, in his 'Fauna Boreali-Americana,' says, "Du Pratz informs us that in his time the moose-deer were found as far south as Ohio; and Denys says that they were once plentiful in the island of Cape Breton, though, at the time he wrote, they had been extirpated. At present, according to Dr. Godman, they are not known in the state of Maine; but they exist in considerable numbers in the Bay of Fundy. They frequent the woody tracts in the fur countries, to their most northern limit. Several were seen on Captain Franklin's last expedition,

at the mouth of the Maekenzie, feeding on the willows, which, owing to the rich alluvial deposits on that great river, extend to the shores of the Arctic Sea, lat. 69° N. Farther to the eastward, towards the Coppermine River, they are not found in a higher latitude than 65° N., on account of the scareity on the Barren-grounds of the aspen and willow, which constitute their food. Mackenzie saw them high up on the eastern declivity of the Roeky Mountains, but I suspeet they are rarely, if ever, found to the westward of the mountains."

The moose-deer appears to be a solitary animal, at least in the more northern latitudes; the older writers speak of it as being found in small herds, but there is room for suspicion that the moose and wapiti are confounded together. From its exquisite sense of hearing, and habitual wariness, the chace of the moose-deer is very diffieult. Dr. Richardson gives the following succinet account of their habits and food, and of the mode of hunting them :—

" In the more northern parts the moose-deer is quite a solitary animal, more than one being very seldom seen at a time, unless during the rutting season, or when the female is accompanied by her fawns. It has the sense of hearing in very great perfeetion, and is the most shy and wary of all the deer speeies, and on this aecount the art of moose-hunting is looked upon as the greatest of an Indian's acquirements, particularly by the Crees, who take to themselves the credit of being able to instruct the hunters of every other tribe. The skill of a moose-hunter is most tried in the early part of the winter; for during the summer the moose, as well as other animals, are so much tormented by musquitoes, that they become regardless of the approach of man. In the winter the hunter tracks the moose by its foot-marks in the snow, and it is necessary that he should keep constantly to leeward of the chace, and make his advances with the utmost caution, for the rustling of a withered leaf or the eracking of a rotten twig is suffieient to alarm the watchful beast. The difficulty of approach is inereased by a habit which the moose-deer has of making daily a sharp turn in its

route, and choosing a place of repose so near some part of its path, that it can hear the least noise made by one that attempts to track it. To avoid this, the judicious hunter, instead of walking in the animal's footsteps, forms his judgment, from the appearance of the country, of the direction it is likely to have taken, and makes a circuit to leeward until he again finds the track. This manœuvre is repeated until he discovers, by the softness of the snow in the foot-marks and other signs, that he is very near the chace. He then disencumbers himself of everything that might embarrass his motions, and makes his approach in the most cautious manner. If he gets close to the animal's lair without being seen, it is usual for him to break a small twig, which alarming the moose, it instantly starts up; but, not fully aware of the danger, squats on its hams, and voids its urine, preparatory to setting off. In this posture it presents the fairest mark, and the hunter's shot seldom fails to take effect in a mortal part. In the rutting season the bucks lay aside their timidity, and attack every animal that comes in their way, and even conquer their fear of man himself. The hunters then bring them within gun-shot by scraping on the blade-bone of a deer and by whistling, which, deceiving the male, he blindly hastens to the spot to assail his supposed rival. If the hunter fails in giving it a mortal wound as it approaches, he shelters himself from its fury behind a tree, and I have heard of several instances in which the enraged animal has completely stripped the bark from the trunk of a large tree by striking with its fore-feet. In the spring-time, when the snow is very deep, the hunters frequently run down the moose on snow-shoes." An instance is recorded in the narrative of Captain Franklin's second journey, where three hunters pursued a moose-deer for four successive days, until the footsteps of the chace were marked with blood, although they had not yet got a view of it. At this period of the pursuit the principal hunter had the misfortune to sprain his ankle, and the two others were tired out; but one of them, having rested for twelve hours, set out again, and succeeded in killing the animal after a further pursuit of

two days' continuance. Notwithstanding the lengthened chace which the moose can sustain when pursued in the snow, Hearne remarks that it is both tender-footed and short-winded; and that, were it found in a country free from underwood, and dry under foot, it would become an easy prey to horsemen and dogs. The same author informs us that in the summer moose-deer are often killed in the water by the Indians who have the fortune to surprise them while they are crossing rivers or lakes, and that at such times they are the most inoffensive of animals, never making any resistance.

"The young ones in particular," says he, "are so simple, that I remember to have seen an Indian paddle his canoe up to one of them, and take it by the poll, without experiencing the least opposition, the poor harmless animal seeming at the same time as contented alongside the canoe as if swimming by the side of its dam, and looking up in our faces with the same fearless innocence that a house-lamb would, making use of its fore-foot almost every instant to clear its eyes of mosquitoes, which at that time were remarkably numerous. The moose is the easiest to tame and domesticate of any of the deer kind."

With respect to the food of the moose, the same traveller says, "Their legs are so long, and their necks so short, that they cannot graze on the level ground like other animals, but are obliged to browse on the tops of large plants and the leaves of trees in the summer, and in winter they always feed on the tops of willows and the small branches of the birch-tree, on which account they are never found during that season but in such places as can afford them a plentiful supply of their favourite food; and although they have no fore-teeth in the upper jaw, yet I have often seen willows and small birch-trees cropped by them in the same manner as if they had been cut by a gardener's shears, though some of them were not smaller than a common pipe-stem; they seem particularly partial to red willows (*cornus alba*)." To the eastward of the Rocky Mountains the evergreen leaves of the *gualtheria shallon* form, according to Lewis and Clark, a favourite part of the food of the moose-deer.

The wooden pipe-stems above alluded to, and used in Hudson's Bay, are, says Dr. Richardson, about the thickness of a little finger.

Destitute as is the elk of the grace and compactness of form so conspicuous in the stag, it is nevertheless a noble and striking animal: those who have contemplated it amidst the wilds of its native regions describe the effect of its appearance as very imposing.

2. RANGIFER.—*Antlers flattened.*

THE REIN-DEER

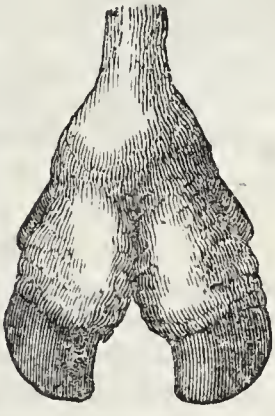
(*Rangifer tarandus*, *Cervus tarandus*, Linn.; *Cervus rangifer*, Brissot).

The rein-deer presents the following characteristics, which form good grounds of separation from the other sections. Both sexes possess horns and canine teeth; the muzzle is covered with hair, excepting that there is a small naked space between the nostrils, the indication, as it were, of the naked muzzle which we find in the succeeding groups. The nostrils are oblique and oval. The head is somewhat large and long, the neck is short and thick, and carried horizontally. The horns, especially in old males, are of great size, but present considerable variation of figure. They may be described, in general terms, as consisting each of a long slender compressed skin, inclined backwards with an outer and upward sweep; a brow antler, sometimes found only on one horn, sometimes on both, advances forward, assuming a vertical palmated form, and hanging over the muzzle: this plate usually terminates in digitations; sometimes, however, it is plain. A second antler rises at some distance above the brow antler, and ascends upwards, assuming at its extremity either a palmated form or dividing into two or three small branches. Besides these, one or two snags rise from the main stem, which generally terminates palmated with deep digitations.

The feet are deeply fissured; when pressed to the ground they spread—when raised up they close together,

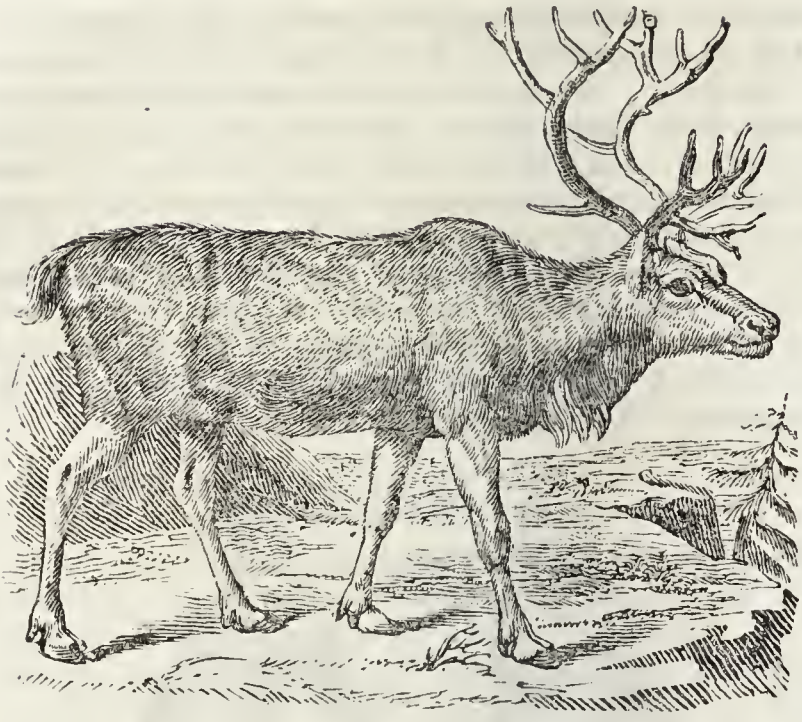
and, if the animal be in quick motion, with a smart snap. (Fig. 61 represents the hoof closed; Fig. 62, the hoof expanded.) The hoofs are round and very concave beneath, with sharp edges; the accessory toes are much developed. The fur consists of two sorts, a soft close under-wool, and an outer covering of close, harsh, brittle, erect hairs, which are elongated beneath the neck so as to hang down like a fringe. The limbs are short and muscular, the shoulders and neck very powerful, the body firmly built, and the whole contour of the frame is such as eminently qualifies the animal for the service of the Laplander. (Fig. 63.)

61.—Foot of Rein-Deer.



62.—Foot of Rein-Deer.

The rein-deer is spread throughout the Aretic regions of Europe, Asia, and America, the wilds of the polar circle being its congenial abode. The finest animals are those of Finmark, Lapland, and especially Spitzbergen; those of Norway and Sweden being inferior in strength and stature. In Asia it extends farther to the south than in Europe, ranging along the Ural chain to the foot of the Caucasian mountains; it is common through the northern latitudes of Siberia, and abounds in Kamtchatka In America, where it is termed the Caribou, it is most numerous between the sixty-third and sixty-sixth degrees of latitude, its most southern limit being about 50° N.



63. – Rein-Deer.

It has been a question whether the rein-deer of Europe, Asia, and America are specifically the same or distinct; we are inclined to regard them as varieties of one species; but are aware that in the opinion of some zoologists there are two distinct species, as indicated by the form of the skull, in the Old World; and that the American rein-deer is again distinct; indeed it is a question whether in America there be not two species; certainly there are two well-marked varieties. The decision of points like these is, however, alien to our present object.

The rein-deer (we allude more expressly to the European animal, though the remarks apply to that of Asia and America) is eminently migratory in its habits, and herds in troops, which travel from the woods to the open hills and back again according to the season. The woods are their winter refuge; here they subsist on the long pendent lichens which hang in festoons from the

trees, on the white lichen which covers the ground, and on the twigs of the birch and willow. With the return of spring they begin their migration from the forest to the mountain ranges, partly to obtain their favourite food, but chiefly in order to escape the myriads of mosquitoes; and especially from the gad-fly (*Œstrus arandi*), which now begins to appear: the latter being greatly dreaded by the rein-deer, the fly not only tormenting it with its sting (ovipositor), but placing its egg in every wound it makes. Fig. 64 represents this formidable insect. So

64.—Œstrus arandi.

imperative is the instinct that impels the Lapland rein-deer to these migratory movements, that it cannot be modified in the domestic race which constitutes the sole wealth of the Laplander, and on which he depends for existence; hence he is obliged to lead a semi-nomadic life, taking periodical journeys of no ordinary toil, from the interior of the country to the mountains which overhang the Norway and Lapland coasts, and back to the interior. (Fig. 65.)

Lapland, says Hoffberg, is divided into two tracts, called the Alpine and Woodland country. Those immense mountains called in Sweden Fjellen divide that country from Norway, extending towards the White Sea as far as Russia, and are frequently more than twelve miles in breadth. The other, called the Woodland division, lies to the east of this, and differs from the neighbouring provinces of Norway by its soil, which is exceedingly stony and barren, being covered with one continued tract of wood, of old pine-trees. This tract

65.—Rein-Deer and Laplanders.

has a very singular appearance. The trees above are covered over with great quantities of a black hanging lichen, growing in filaments resembling locks of hair, while the ground beneath appears like snow, being totally covered with white lichens. Between this wood and the Alps lies a region called the Woodland, or Desert Lapmark, of thirty or forty miles in breadth, of the most savage and horrid appearance, consisting of scattered uncultivated woods, and continued plains of dry barren sand, mixed with vast lakes and mountains. When the mosses on part of this desert tract have been burnt, either by lightning or any accidental fire, the barren soil immediately produces the white lichen which covers the lower parts of the Alps. The rein-deer in summer seek their highest parts, and there dwell amidst their storms and snows, not to fly the heat of the lower regions, but to avoid the gnat and gad-fly. In winter these intensely cold mountains, whose tops reach high into the atmosphere, can no longer support them, and they are obliged to return to the desert and subsist upon the lichens. Of

these, its principal food is the rein-deer lichen. There are, says Hoffberg, two varieties of this: the first is called *sylvestris*, which is extremely common in the barren deserts of Lapland, and more particularly in its sandy and gravelly fields, which it whitens over like snow; its vast marshes, full of tussocks of turf, and its dry rocks, are quite grown over by it. The second variety of this plant, which is less frequent than the former, is named the Alpine; this grows to a greater height, with its branches matted together: it has this name, because when those mountains are cleared of their wood the whole surface of the earth is covered with it; yet it is seldom to be found on their tops. When the woods become too luxuriant, the Laplander sets fire to them, as experience has taught him that when the vegetables are thus destroyed the lichen takes root in the barren soil and multiplies with facility, though it requires an interval of eight or ten years before it comes to a proper height. The Laplander esteems himself opulent who has extensive deserts producing this plant exuberantly; when it whitens over his fields, he is under no necessity of gathering in a crop of hay against the approach of winter, as the rein-deer eats no dried vegetable, unless perhaps the river horsetail (*Equisetum fluviatile*). They rout for this lichen under the snow like swine in a pasture. It sometimes happens (but very rarely) that the winter sets in with great rains, which the frost immediately congeals; the surface of the earth is then covered with a coating of ice before the snow falls, and the lichen is entirely incrusted and buried in it. Thus the rein-deer are sometimes starved, and famine attacks the Laplanders. In such an exigence they have no other resource but felling old fir-trees overgrown with the hairy liverworts. These afford a very inadequate supply, even for a small herd, but the greater part of a large one, in such a case, is sure to perish with hunger.

With the approach of winter the coat of the rein-deer begins to thicken, and, like that of most polar quadrupeds, to assume a lighter hue. In a domesticated state the animal is subject to a great variety of colour: many are

66.—White Rein-Deer.

white, and mottled individuals are by no means uncommon. (Fig. 66.) Sir Arthur Brooke and other writers notice the strange propensity to devour the lemming (*Arvicola Norvegicus; Mus lemnus*, Linn.) which this animal often exhibits; and Captain Franklin observes that the American rein-deer "are accustomed to gnaw their fallen antlers, and to devour mice." We cannot account for such an anomaly in the habits of a ruminating animal, otherwise than by attributing it to a morbid appetite. To the natives of Finmark, Lapland, and the shores of the Arctic Sea, the rein-deer is in every sense important; not only is it a beast of burden, but its flesh and milk are alike in requisition. In these countries

> "Their rein-deer form their riches; these their tents,
> Their robes, their beds, and all their homely wealth

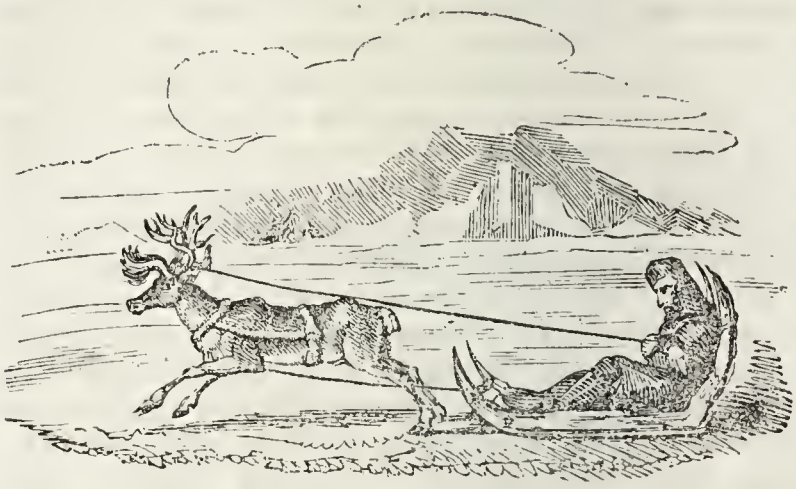
Supply—their wholesome fare, and cheerful cups;
Obsequious to their call, the docile tribe
Yield to the sled their necks, and whirl them swift
O'er hill and dale."

M. de Broke says, "The number of deer belonging to a herd is from three hundred to five hundred; with these a Laplander can do well, and live in tolerable comfort. He can make in summer a sufficient quantity of cheese for the year's consumption; and during the winter season can afford to kill deer enough to supply him and his family pretty constantly with venison. With two hundred deer, a man, if his family be but small, can manage to get on. If he have but one hundred, his subsistence is very precarious, and he cannot rely entirely upon them for support. Should he have but fifty, he is no longer independent, or able to keep a separate establishment, but generally joins his small herd with that of some richer Laplander, being then considered more in the light of a menial, undertaking the laborious office of attending upon and watching the herd, bringing them home to be milked, and other similar offices, in return for the subsistence afforded him."

Von Buch, a celebrated traveller, has well described the evening milking-time, in a Laplander's summer encampment on the mountains.

Early in September the herds and their owners commence their return from the coast in order to reach their winter-quarters before the fall of the snows; and it is when the winter is fairly set in that the peculiar value of the rein-deer is felt by the Laplander, and his powers called into operation. Without him communication would be almost utterly suspended. Harnessed to a sledge (Fig. 67) the rein-deer will draw about three hundred pounds: but the Laplanders generally limit the burden to two hundred and forty pounds. The trot of the rein-deer is about ten miles an hour; and the animal's power of endurance is such, that journeys of one hundred and fifty miles in nineteen hours are not uncommon. There is a portrait of a rein-deer in the palace of Drotningholm (Sweden), which is represented,

upon an occasion of emergency, to have drawn an officer with important despatches the incredible distance of eight hundred English miles in forty-eight hours. This event is stated to have happened in 1699, and the tradition adds, that the deer dropped down lifeless upon his arrival.



67.—Rein-Deer harnessed to a Sledge.

The obstinacy which the rein-deer sometimes displays is the preservation of his driver. The great difficulty is to separate him from his companions, or to prevent him joining the herds which he sees upon his track. This gregarious disposition is given him for his protection against the danger of a solitary state, and the Laplander avails himself of it when he loses his road, or is separated from those with whom he travels.

"In proceeding along the extensive and endless lakes of Lapland, if the number of deer be great, a close and lengthened procession is invariably formed; each deer following the foremost sledge so closely that the head of the animal is generally in contact with the shoulders of the driver before. Should the guide alter his direction, by making a bend to the right or left, the whole of the deer in the rear will continue their course, till they arrive at the spot where the turn was made. It thus frequently happens that, when the distance between

the foremost and hindmost deer is great, the guide making a bend, considerable saving might be obtained by cutting across. This, however, it is scarcely possible to do; for should the deer even be pulled by main force out of its former course, it will immediately turn aside from the new direction it is placed in, and regain the old track, in spite of all the driver can do to prevent it. It is useless to contend with the animal; and the time thus lost might leave the driver at such a distance from the rest of the party as to render it a matter of some difficulty to overtake them. This unwillingness to separate from its companions is one feature of the instinct given to this animal; and it is the very circumstance that, more than any other, ensures the safety of the traveller. Should any accident separate him from the rest of his party, the deer be fatigued, or other occurrences throw him considerably in the rear, if he trust entirely to his deer, it will enable him to overtake the rest though they should be some miles in advance, from the exquisite olfactory sense it possesses. The animal, in this case, holding its head close to the snow, keeps frequently smelling, as a dog would do to scent the footsteps of its master; and is thus enabled to follow with certainty the track the other deer have gone. Were it not for this property of the animal, travelling across Lapland would be not a little hazardous, particularly in those parts where the weather is the darkest, which is generally while crossing the mountains of Finmark. It often happens that the party is unavoidably scattered, and the sound of the bell enables them to rejoin each other. The bells, however, should the weather be very thick and stormy, can only be heard a short distance off; and it is then by the sagacity of the deer alone that the difficulty is surmounted."*

The mode of hunting the wild rein-deer by the Laplanders, the Esquimaux, and the Indians of North America, has been accurately described by various travellers. We select the following accounts from the interesting

* De Broke, p. 462.

narratives of Captain Lyon and Captain Franklin. Captain Lyon says,—

"The rein-deer visits the polar regions at the latter end of May or the early part of June, and remains until late in September. On his first arrival he is thin, and his flesh is tasteless, but the short summer is sufficient to fatten him to two or three inches on the haunches. When feeding on the level ground, an Esquimaux makes no attempt to approach him, but should a few rocks be near, the wary hunter feels secure of his prey. Behind one of these he cautiously creeps, and having laid himself very close, with his bow and arrow before him, imitates the bellow of the deer when calling to each other. Sometimes, for more complete deception, the hunter wears his deer-skin coat and hood so drawn over his head, as to resemble, in a great measure, the unsuspecting animals he is enticing. Though the bellow proves a considerable attraction, yet if a man has great patience he may do without it, and may be equally certain that his prey will ultimately come to examine him; the rein-deer being an inquisitive animal, and at the same time so silly, that, if he sees any suspicious object which is not actually chasing him, he will gradually, and after many caperings, and forming repeated circles, approach nearer and nearer to it. The Esquimaux rarely shoot until the creature is within twelve paces, and I have frequently been told of their being killed at a much shorter distance. It is to be observed, that the hunters never appear openly, but employ stratagem for their purpose; thus, by patience and ingenuity, rendering their rudely-formed bows, and still worse arrows, as effective as the rifles of Europeans. When two men hunt in company, they sometimes purposely show themselves to the deer, and when his attention is fully engaged, walk slowly away from him, one before the other. The deer follows, and when the hunters arrive near a stone, the foremost drops behind it and prepares his bow, while his companion continues walking steadily forward. This latter, the deer still follows unsuspectingly, and thus passes near the concealed man, who takes a deliberate aim and

kills the animal. When the deer assemble in herds, there are particular passes which they invariably take, and on being driven to them are killed by arrows by the men, while the women with shouts drive them to the water. Here they swim with the ease and activity of water-dogs, the people in kayaks chasing and easily spearing them; the carcases float, and the hunter then presses forward and kills as many as he finds in his track. No springs or traps are used in the capture of these animals, as is practised to the southward, in consequence of the total absence of standing wood."*

Captain Franklin describes the mode in which the Dog-rib Indians kill the rein-deer, which he had from Mr. Wentzel, who resided long amongst that people :—

"The hunters go in pairs, the foremost man carrying in one hand the horns and part of the skin of the head of a deer, and in the other a small bundle of twigs, against which he, from time to time, rubs the horns, imitating the gestures peculiar to the animal. His comrade follows, treading exactly in his footsteps, and holding the guns of both in a horizontal position, so that the muzzles project under the arms of him who carries the head. Both hunters have a fillet of white skin round their foreheads, and the foremost has a strip of the same round his wrists. They approach the herd by degrees, raising their legs very slowly, but setting them down somewhat suddenly, after the manner of a deer, and always taking care to lift their right or left feet simultaneously. If any of the herd leave off feeding to gaze upon this extraordinary phenomenon, it instantly stops, and the head begins to play its part by licking its shoulders, and performing other necessary movements. In this way the hunters attain the very centre of the herd without exciting suspicion, and have leisure to single out the fattest. The hindmost man then pushes forward his comrade's gun, the head is dropped, and they both fire nearly at the same instant. The deer scamper off, the hunters trot after them: in a short time the poor

* Private Journal.

animals halt, to ascertain the cause of their terror; their foes stop at the same moment, and, having loaded as they ran, greet the gazers with a second fatal discharge. The consternation of the deer increases; they run to and fro in the utmost confusion; and sometimes a great part of the herd is destroyed within the space of a few hundred yards."

In America the rein-deer appears to be as migratory as its Old World relative. Dr. Richardson describes two varieties of this animal inhabiting the northern regions of that continent: the one under the name of the Woodland Caribou (Var. *sylvestris*); the other under that of the Barren-ground Caribou (Var. *Arctica*).

The Woodland Caribou (Caribou of Theodat, La Hontan, Charlevoix, &c.; Rein-deer of Drage, Dobbs, &c.; Attekh of the Cree Indians; Tantseeah of the Copper Indians, Richardson).—This variety is much larger than the Barren-ground caribou, but inferior as an article of food. Its proper country is a stripe of low primitive rocks well clothed with wood, about 100 miles wide, and extending, at the distance of 80 or 100 miles from the shores of the Hudson's Bay, from Lake Athapescow to Lake Superior. "Contrary to the practice of the Barren-ground caribou, the Woodland variety travels to the southward in the spring. They cross the Nelson and Severn rivers in immense herds in the month of May, pass the summer on the low and marshy shores of James's Bay, and return to the northward and at the same time retire more inland in the month of September." The weight of the Woodland caribou varies from two hundred to two hundred and forty pounds.

The Barren-ground caribou (Common Deer of Hearne; Bedsee-awseh of the Copper Indians and Dog-ribs; Bedsee-choh (male), Tsootai (female), Tampeh (female with a fawn) of the same; Took-too of the Esquimaux, Took-took dual, Took-toot plural (Richardson); Tukta of the Greenlanders (Pangnek, male; Kollowak, female; Norak, young, Fabricius). This variety (species?) is of small stature, the buck weighing, exclusive of the offal, from ninety to one hundred and thirty

pounds, according to the animal's condition. The herds of the Barren-ground caribou spend the summer on the coast of the Arctic Sea, and in winter retire to the woods between the sixty-third and sixty-sixth degrees of latitude, where they feed on the *Usneæ*, *Alectariæ*, and other arboreal lichens, as well as on the long grass of the

68.—Horns of Caribou.

swamps. About the end of April they make short excursions from the woods, in order to obtain the terrestrial lichens (*Cetrariæ*, *Cornicilariæ*, and *Cenomyces*), which, now that the snows are partially melted, are both soft and easily to be collected. "In May the females pro-

ceed to the sea-coast, and towards the end of June the males are in full march in the same direction. At this period the sun has dried up the lichens on the Barren-grounds, and the caribou frequents the moist pastures which cover the bottoms of the narrow valleys on the coast and islands of the Arctic Sea, where they graze on the sprouting carices, and on the withered grass or hay of the preceding year, which at that period is still standing and retaining part of its sap. The spring journey is performed partly on the snow, and partly, after the snow has disappeared, on the ice covering the rivers and lakes, which have in general a northerly direction." Soon after their arrival on the coast, the females produce their young. In September the herds begin their return southwards to the forests, which they reach towards the end of October; and are then joined by the males. This retrograde journey is performed after the snows have fallen, but before the heavy frost has set in, so that they are able to procure the lichens, which are still tender and pulpy, by scratching up the snow with their feet, which are well adapted by the concavity of their rounded sharp-edged hoofs for this important purpose. Figs. 68 and 69 are copies of drawings, by Captain Back, of the horns of two old buck caribous, killed on the Barren-grounds in the neighbourhood of Fort Enterprise. They are distinguished by their palmations. Dr. Richardson states that he can confidently assert, after having seen many thousands of the Barren-ground caribou, "that the horns of the old males are as much if not more palmated than any antlers of the European rein-deer to be found in the British museums;" which is contrary to Colonel Smith's opinion, that the horns of the caribou are shorter, less concave, more robust, with a narrower palm, and fewer processes than those of the Lapland rein-deer. So numerous, however, are the varieties of form which the horns of the rein-deer assume, that little stress can be laid upon them as affording distinguishing characters.

It is not only the flesh of the caribou that is sought after by the Indians, its skin is of great value.

Dr. Richardson informs us, that the skin of the caribou dressed with the hair on it is so impervious to cold, that if clothed in a suit of this material, and wrapped in a mantle of the same, a person may bivouac all night in the snow with safety during the intensity of an Arctic winter.

69.—Horns of Caribou.

So closely indeed are the hairs set, that it is impossible, by separating them, to discern the skin from which they arise. To the tribes of the polar circle clothing of such material is inestimable.

The flesh, when in high condition, has several inches of fat on the haunches, and is equal to the best fallow-deer venison. The tongue is highly esteemed. A preparation called pemmican is made by pouring one-third

of melted fat over the pounded meat, and incorporating them well together. The Esquimaux and Greenlanders consider the paunch with its contents of lichen a great delicacy; and in Boothia, as Captain James Ross affirms, these contents form the only vegetable food which the natives ever taste.

3. Dama.—*Antlers merging into broad digitated palmations.*

The Fallow-Deer.

This well-known ornament of our parks is the Hydd (Buck), Hyddes (Doe), Elain (Fawn), of the ancient British; Le Daim (Buck), La Daime (Doe), Faon (Fawn), of the French; Daino (Buck), Damma (Doe), Cerbietto, Cerbietta (Fawn), of the Italians; Gama, Corza (Buck), Venadito (Fawn), of the Spanish; Corza (Buck), Veado (Fawn), of the Portuguese; Damhirsch of the Germans; Dof, Dof Hjort, of the Swedes; Daae, Dijr, of the Danes; *Dama vulgaris* of Gesner; *Cervus palmatus* of Klein; *Cervus platyceros* of Ray; and *Cervus dama* of Linnæus.

Desmarest, who regards the fallow-deer as the *Platyceros* of Pliny, and the Ἔλαφος εὐρυκέρως of Oppian (as did also Pennant), observes that it is less extensively spread in Europe than the stag: it does not exist in Russia, but it would seem that it inhabits Lithuania, Moldavia, and Greece, the north of Persia and China, and also Abyssinia; it is abundant in England, but of rarer occurrence in France and Germany.

Cuvier, who remarks that the fallow-deer has become common in all the countries of Europe, adds, "but it appears to be originally a native of Barbary." And he subjoins in a note, that, "since the publication of his last edition of the 'Ossemens Fossiles,' he has received a wild fallow-deer killed in the woods to the south of Tunis." We have ourselves examined horns of the fallow-deer brought from the same territory. In Spain, according to Pennant, the breed is very large; and he goes on to state that, "in every country excepting our

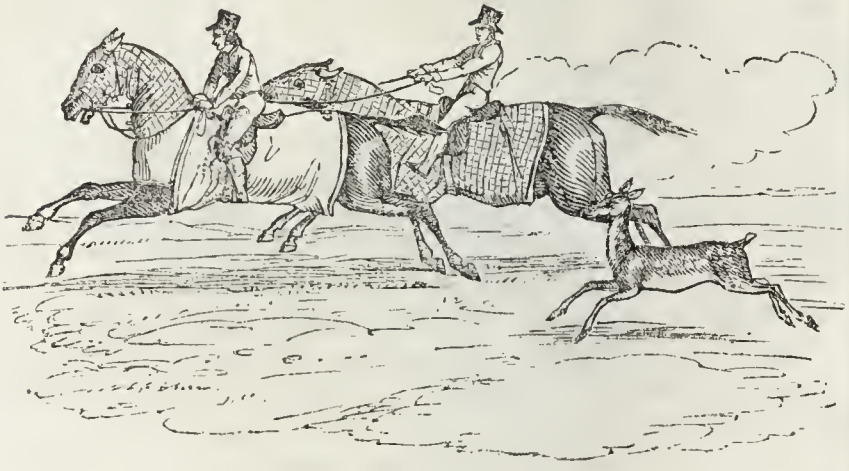
70.—Fallow-Deer.

own, these deer are in a state of nature, unconfined by man, but they are, and have been for some time, confined in parks on the Continent, as they are in England." We may observe that in England, at one period, before parks were enclosed and (as is necessary in our day) the herds were restricted within due bounds, the fallow-deer wandered in freedom, like the stag or roe ; they tenanted the great forest which in the time of Henry II. stretched northwards from London, and which, as Fitz-Stephen says, was the covert of stags, deer (damarum), boars, and wild bulls. Pennant informs us that in the old Welsh laws a fallow-deer was valued at the price of a cow, or, as some say, a he-goat.

The fallow-deer is too well known to need describing in detail. (Fig. 70.) Its venison is far superior to that

of the stag or roe, and its horns and skin are valuable. Except during the pairing season, when the bucks associate with the does, and during the winter, when the troops mingle promiscuously together, the males and females form separate herds.

The female goes eight months with young, and produces one, sometimes two, at a birth, concealing them among the tall fern or dense underwood of the park; they afterwards associate with the herds of does.



71.—Fallow-Deer and Horses.

The buck acquires a different name, in the language of "venerie," every year to the sixth. The first year he is a *fawn*—the second, when the simple horns appear, a *pricket*—the third, a *sorrel*—the fourth, a *soare*—the fifth, a *buck of the first head*—the sixth, a *buck complete*. In Shakspere's play of 'Love's Labour 's Lost,' the "extemporal epitaph on the death of the deer," in which Holofernes "something affects the letter," and in which three of the above terms are employed, is familiar to all. During the pairing season, which takes place at the end of summer or in autumn, the males utter a deep tremulous cry, and engage with each other in obstinate battles, which are continued day after day, till the mastery is completely established. We do not, however, believe that at this season they are dangerous to persons approaching them; the stag has been known to make a

furious attack, but we never heard of similar instances with respect to the fallow-deer.

The fallow-deer may be easily rendered tame and familiar, as we ourselves have often seen. It is said, when thus tamed and brought up in the stable-yard, to delight in the company of the horse; and in proof thereof it may be observed, that at Newmarket (1828) there was a deer which was accustomed regularly to exercise with the racehorses, and the creature delighted to gallop round the course with them in their morning training. Fig. 71 represents the morning gallop of the associated deer and horses.

The Fossil Elk of Ireland (*Cervus megaceros; C. giganteus*, Goldf.).—To the Platycerine or Dama group appears to belong that noble species commonly called the fossil elk of Ireland, from its abundance in that country, where its remains occur in bogs and marl-pits, and that so abundantly, that they have ceased to be regarded as objects of curiosity. The huge antlers, indeed, have been used as gates, as stop-gaps in the fields, and for similar purposes. Though most frequent in Ireland, the bones of this species are also found in similar deposits in the Isle of Man, as well as in England; and have been dug up in France, Germany, and Italy, where, according to Cuvier, they occur in the same strata with bones of elephants. Ireland was perhaps the last stronghold of the species, which appears to have once thronged that island. It is very seldom, however, that an entire skeleton has been discovered, the remains consisting for the most part of skulls, with the horns attached, and various separate bones disposed without any order. They generally occur in a deposit of shell-marl, covered by a layer of peat, and resting on clay. In this situation, one of the few entire skeletons discovered is stated to have occurred. "Most of the bones," says Archdeacon Maunsell, "and heads, eight in number, were found in the marl; many of them, however, appeared to rest on the clay, and to be merely covered with the marl." It is worthy of remark, that the fossil remains of no other

animals are mingled with them. Of the skeleton to which we have alluded, and which graces the museum of the Royal Dublin Society, Mr. Hart drew up a Memoir. "This magnificent skeleton," he observes, "is perfect in every single bone of the framework which contributes to form a part of its general outline; the spine, the chest, the pelvis, and the extremities are all complete in this respect; and when surmounted by the head and beautifully expanded antlers, which extend out to a distance of nearly six feet on either side, forms a splendid display of the reliques of the former grandeur of the animal kingdom, and carries back the imagination to a period when whole herds of this noble animal wandered at large over the face of the country." The following are a few points of its admeasurement:—

	ft.	in.
Length of the head	1	$8\frac{3}{4}$
Breadth between the orbits	0	$10\frac{1}{2}$
Distance between the tips of the horns, measured by the skull	11	10
Ditto, in a straight line across	9	2
Length of each horn	5	9
Greatest breadth of palm	2	9
Circumference of the beam at the root of the brow-antler	1	$0\frac{3}{4}$
Length of spine	10	10
Height to the top of the back	6	6
Ditto, to the highest point of the tip of the horn	10	4

None of the deer tribe of the present day, excepting the Scandinavian elk, can at all be compared for magnitude to this fossil species; and, until Cuvier pointed out the differences, the antlers were generally regarded as identical with those of that animal or of the moose of North America. Independently of size, however, they differ in many essential points: for example, in the moose-deer the horn has two palms, a lesser one growing forward from the front of the beam where the principal palm begins to expand: the palm of the moose-deer's horn is directed backwards, and is broadest next the beam. In the fossil animal the palm increases in breadth as it

proceeds, which it does in a lateral direction; nor are there fewer differential characters in the skull and general skeleton.

Of the habits of the *Cervus megaceros* we can only form a conjecture. The size and lateral direction of its spreading antlers must have prevented its inhabiting the dense forest—it must have dwelt on the heath-clad hills: there, armed with the most powerful weapons of self-defence, it ranged secure from the assault of any single aggressor, capable of dashing down the wolf or hyæna with a blow. Did man exist coeval with this animal in its native land? Most probably—yes. A head of the fossil elk, together with several urns and stone hatchets, was discovered in Germany in the same drain. "In the 'Archæologia Britannica' is a letter of the Countess of Moira, giving an account of a human body in gravel under eleven feet of peat, soaked in the bog-water: it was in good preservation, and completely clothed in antique garments of hair," conjectured to be that of the fossil elk. But what is still more conclusive, there exists a rib in the Royal Dublin Society, evidently bearing token of having been wounded by some sharp instrument, which remained long fixed in the wound, but had not penetrated so deep as to destroy the creature's life: it was such a wound as the head of an arrow would produce.

Of the causes which involved the fossil elk in destruction—whether one general catastrophe universally affected the whole race wherever existing—whether local causes, operating at different epochs, have successively extinguished the species, which might have lingered the longest in Ireland—or whether its extermination has been effected by the hand of man, whose agency upon the animal creation is everywhere apparent, no decided opinion can yet be given. We know it existed, and that is all: its history and its fate are buried beneath the shadow of years gone by.

4. Elaphus, or Stag Group.

The common stag of Europe, with its allied species the Barbary stag and the Persian stag, the wapiti of

America, and among others the *Cervus elaphoïdes*, Hodgson, and *Cervus wallichii*, Cuvier, both natives of Nepâl, may be adduced as examples of this section. The characters consist in the form of the horns, which have three antlers produced from the beam, viz. the brow-antler, the bez-antler, and the antler-royal, besides the snags, or crown (*surroyal*), in which the beam terminates; in the nakedness of the muzzle; and in the possession of large suborbital sinuses. The males have canine teeth, and in old animals the brow-antler is often double. A fine specimen of the horns of the wapiti in the museum of the Zoological Society exhibits this luxuriance of growth. (Fig. 72.)

72.—Horns of Wapiti.

The Common Stag, or Red-Deer

(*Cervus elaphus*). Carw (Stag), Ewig (Hind), Elain (Young or Calf), of the ancient British; Le Cerf (Stag), La Biche (Hind,) Faon (Young or Calf), of the French; Cervio, Cervia, of the Italians; Ciervo, Cierva, of the Spanish; Cervo, Cerva, of the Portuguese; Hirsch or Edelhirsch (Stag), Hirschkuh (Hind,) Hirschkalb (Calf), of the Germans; Hart (Stag), and Hinde, of the Dutch; Hjort, Kronhjort (Stag), and Hind, of the Swedes; Kronhjort, Hind, Kid or Hind Kalv, of the Danes.

The red-deer is a native of our island and of the temperate portions of Europe, and considerably exceeds the fallow-deer in size, standing about four feet in height at the shoulders. The hind or female is smaller; the young is spotted with white on the back and sides. (Fig. 73.) During the pairing season, which commences in August, the stags fight desperately with each other, and are even dangerous to persons venturing near their haunts. Formerly the stag was very abundant on the wild hills and in the extensive forests of our island, but the disforesting of vast woodland tracts and the extension of agriculture have limited the range of this noble animal to the larger parks and chaces of our country, to the Cheviot Hills, and to the heath-covered mountains of Scotland. Few or none are to be seen in the New Forest, nor in Woolmer Forest, in Hampshire, where they were once numerous, nor do any now remain in Epping Forest. In the central part of the Grampians there are large herds of red-deer: they frequent the southern part of the bleak and, generally speaking, naked ridge of Minigny, which lies between the Glen of Athol on the south and Badenach on the north, and between the lofty summits of Ben-y-glae on the east and the pass of Dalnavardoch on the west. The greater part of this ridge is the property of the Duke of Athol, although many deer are found on the lands of the Duke of Gordon and others towards the east.

The deer are seldom on the summits; but generally in the glens of the Tilt and Bruar. These deer are often seen in herds of upwards of a thousand; and when, in a track where there is no human abode for twenty or thirty miles, a long line of bucks appear on a height with their branching horns relieved upon a clear mountain sky, the sight is very imposing.

The forest of Athol, consisting of a hundred thousand acres, is devoted to red-deer; they exist in Mar Forest and Glenartney, and in the west districts of Ross and Sutherland. The chace of the red-deer has ever been, from its excitement, a favourite diversion, and formerly was

73.—Red-Deer.

74.—Red-Deer.

conducted in a style of great magnificence, vast herds being driven "with hound and horn" to where the hunters were stationed with guns (formerly bows and arrows), and who dealt havoc among their numbers. The deer moved forwards in close array, guided by a leader, and often in despair broke through the circle of their foes, and made their escape. We may imagine the danger resulting from the rush of perhaps a thousand deer determined to break through the line of their assailants.

The spirited description of a similar scene in Sir W. Scott's novel of 'Waverley' is familiar to all. This

mode of driving the deer is now never practised, at least on the great scale. The present plan, that of deer-stalking, is to proceed cautiously within due distance of the herd, and, being concealed, to bring them down with the rifle: when wounded and brought to bay, the stag often rushes on his assailant, whose life is in imminent danger. The red-deer is too well known to require a detailed description. He swims vigorously, and will cross lakes, and pass from islet to islet at considerable distances apart. (Fig. 74.)

The Wapiti (*Cervus wapiti*, Mitchell).

C. strongyloceros, Schreber; *C. Canadensis*, Briss.; American Elk, Bewick; Waskeesews of Hutchins; Wawaskecsho, Awaskees, and Moostosh of the Cree Indians. The wapiti has been confounded with the elk, this name being given to it in Lewis and Clark's Voyages. It is the red-deer of the Hudson's Bay traders. This American representative of our European stag differs from the latter, in being much larger and more powerful, and also of a darker colour; his form is more heavy, and the limbs more robust; the neck is of vast thickness and strength. (Fig. 75.)

The wapiti does not extend its range higher north than the fifty-seventh parallel of north latitude, nor is it found to the eastward of a line drawn from the north end of Lake Winnipeg in 103° W. long., and from thence till it strikes the Elk River in 111° W. long.

It is common among the clumps of wood that skirt the plains of the Saskatchewan, where it lives in small herds of six or seven individuals. They feed, says Dr. Richardson, on grass, on the young shoots of willows and poplars, and are very fond of the hips of the *Rosa blanda*, which forms much of the underwood of the districts which they frequent. Their voice is a shrill whistling, quivering noise, nothing resembling the "bell" of our stag. Hearne considers the wapiti as more stupid than any other species of the deer tribe.

The horns of this species (Fig. 72) attain to a vast

75.—Wapiti.

size and weight (fifty-three or fifty-four pounds the pair), and are most formidable weapons: nor is the male thus armed to be approached without caution; his temper being vicious and irascible, and his strength prodigious. A few years since, one of the male wapitis in the gardens of the Zoological Society, London, in a fit of rage drove his brow-antlers into the body of a female of the same species, lifted her up, and threw her down dead.

The male wapiti stands upwards of four feet and a half at the shoulders. The general colour is yellowish brown, a black mark extending from the angle of the mouth along the lower jaw; the tail is short and en-

circled (as in the red-deer and others of this section) by a pale yellowish haunch-mark.

5. Rusa.

This group consists of deer peculiar to India, several species being large and formidable. The horns are rugged and cylindrical, with a large sharp brow-antler, but no bez-antler, the beam bifurcating at the top into a sharp anterior and posterior snag: the muzzle is broad and naked, the suborbital sinuses are deep and large, and the males possess canine teeth; a mane of long coarse hairs runs down the neck. Of six or seven species belonging to this section, we may notice the Sambur.

The Sambur (*Cervus hippelaphus*).

Several specimens of this deer are in the gardens of the Zoological Society, London; and the males when armed with their antlers are noted for their vicious temper. In size the male sambur exceeds our common stag, but is inferior to the huge and heavy wapiti; and if less powerful, is more active and alert. The hair is close, harsh, and of a dusky or grayish brown; a band of black surrounds the muzzle, but the edges of the upper lip and the tip of the under are white; the hairs of the throat are long and bristly, forming a full fringe; a mane of similar hair runs along the back of the neck: the crupper-mark round the tail is very circumscribed, and yellowish. (Fig. 76.) The sambur is found in the Ghauts of the Deccan, in Kandeish, and the lower hills of Nepâl. It occurs also in other districts of India. In common with the rest of the Rusa tribe it is fond of the water, and resides in wooded situations.

Another species of this section is the *Cervus Aristotelis*, Cuvier, a native of Bengal and the low hills of Nepâl. It is termed elk by the British sportsman, and is said to be extremely powerful and vicious. Mr. Hodgson notices a black deer in the Nepâl hills belonging to the Rusa tribe, but undescribed. ('Zool. Proceeds.' 1834, p. 99.)

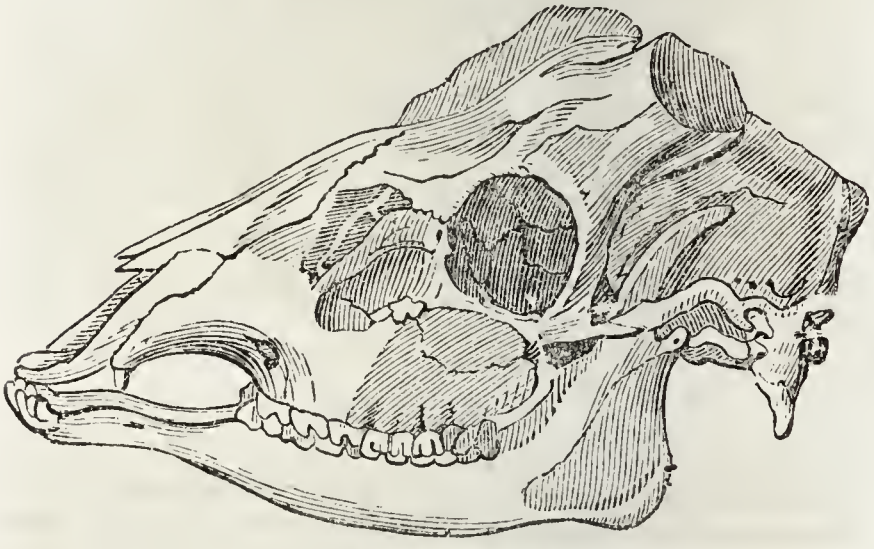
76.—Sambur-Deer.

Of the other species to be referred to this group, and described by various authors, we may mention the *Cervus equinus*, Cuvier, found in Sumatra and the lower hills of Nepâl; the *C. unicolor*, Smith, a native of the dense forests of Ceylon; the *C. Peronii*, Cuvier; and the *C. Mariannus*, Quoy and Gaimard—the former a native of Timor, the latter of the Marianne Islands, or Ladrones.

Mr. Hodgson observes that a new species of deer, to which he has given the name of *C. bahrainja*, serves, with *C. wallichii*, to connect the Elaphine and Rusan groups. Fig. 77 represents the skull of the sambur-deer.

6. Axis.

The characters of this section differ but little from those of Rusa; the horns have a brow-antler, and bifurcate at the top; the suborbital sinuses are moderate, and the males are destitute of canines. It is, however, in size, contour, and disposition that the greatest contrast exists between the Axine and Rusan groups. In the Axine group the limbs are delicate, the general form is more graceful than robust, and none in size much exceed our fallow-deer, to which the common axis especially (excepting as respects the antlers) bears a near resemblance; the females, indeed, of both species being,



77.—Skull of Sambur-Deer.

on a superficial view, scarcely distinguishable. The hair is short, smooth, and close; the expression of the physiognomy is gentle, yet animated, and agrees with the disposition. In captivity these deer are quiet and inoffensive.

The Axis-Deer (*Cervus axis*, Erxl.).

The spotted axis is, perhaps, the best known of all the Indian deer: it thrives well not only in our mena-

78.—Axis.

geries, but even in parks, and breeds in our climate. It is very abundant on the banks of the Ganges and in Bengal, as well as in the larger islands of the Indian Archipelago, where it lives in herds, the luxuriant vegetation of the jungles (its favourite localities) affording abundance of food. The general colour of this species is fawn-yellow, a black stripe running down the spine of the back; the sides are beautifully and regularly spotted with white; a row forming an almost continuous line passes along each side of the belly. (Fig. 78.)

The Hog-deer (*C. porcinus*) is another species belonging to this section: it is lower on the limbs and stouter in the body than the spotted axis: its colour is yellowish-gray, spotted slightly on the back and flanks.

A new species from the Ganges is described by Mr. Ogilby in the 'Zool. Proceeds.' 1831, p. 136, under the title of *C. Nudipalpebra*. A specimen exists in the museum of the Zoological Society.

7. Capreolus.—The Roes.

The roes or roebucks are distinguished by the following characters:—The horns are small, cylindrical, and rugged; and when fully developed are divided above into three snags, of which the largest is seated anteriorly. The muzzle is naked, and there are neither canines nor suborbital sinuses. The tail is extremely short, the body compact, the limbs slender but vigorous.

The Common Roebuck (*Cervus capreolus*).

This species is the *Caprea*, *Capreolus dorcas*, of Gesner; *Capreolus* of Ray and of Sibbald; *Cervus capreolus* of Linnæus; *Cervus minimus*, of Klein; Iwreh (male), Iyreheli (female), of the ancient British; Le Chevreuil of the French; Capriolo of the Italians; Zorlito, Cabronzillo montes, of the Spanish; Cabra montes of the Portuguese; Rehboek (male), Rehgees, of the Germans; Radiur, Raboek, of the Swedes; Raaedijr, Raaebuk, of the Danes.

The roebuck was formerly common throughout the whole of our island, but is now almost exclusively confined to the wooded hills of Scotland north of the Forth. South of that river it is very rare, one or two wild parks only possessing a few; but in the rugged woods of Westmorland and Cumberland it is tolerably abundant. It is widely spread throughout the temperate latitudes of continental Europe, wherever extensive forests and wild uncultivated districts covered with brushwood afford it an asylum.

The roebuck is the least, and one of the most active and beautiful, of our European deer; wild, shy, and cautious, it does not herd in troops, but lives singly, or in small companies consisting of the male, female, and

79.—Roebuck.

young; the latter being generally two, sometimes three, in number. These remain for eight or nine months with their parents, which continue attached for life. The roe is more cunning than the stag, and when hunted will endeavour, by various subtle artifices, to elude its pursuers. It will wind and double on its track, then take bounds of surprising extent, and lie close amongst the herbage of its covert till the dogs, having lost the scent, pass off to a distance. The flesh of this animal is not in high estimation.

The roe stands about two feet three inches in height at the shoulder. In the winter the hair on the body is long, the lower part of each hair is ash-coloured; there is a narrow bar of black near the end, and the tip is yellow. On the face the hair is black, tipped with yellow. The ears are long, of a pale yellow on the in-

side, and covered with long hair. In summer the coat is short and smooth, and of a bright reddish colour. The chest, belly, legs, and inside of the thighs, are yellowish white; the rump is pure white; and the tail very short. On the outside of the hind-leg, below the joint, is a tuft of long hair. (Fig. 79.)

A specimen of the roe of Tartary (*C. pygargus*, Pallas), the tailless roe of Pennant, once fell under our notice. In size it equals the fallow-deer; it inhabits the mountain districts of Hyrcania and other parts of Northern Siberia, and also the snowy range of Central Asia.

8. Mazama, or American Fallow-Deer.

The elegant deer composing this section are all confined to the American continent. The horns are rough, with a cylindrical stem, and slightly compressed branches, which have a tendency to form arches or segments of a circle. Of these an anterior branch projects somewhat forwards; the stem sweeps outwards, curving inwards and forwards at its extremity, which divides into two or three branches. There are no canines. The suborbital sinuses are small, and appear like a fold of the skin. The ears are long and open; the tail is long, and inclining to be bushy; the muzzle is naked. The species belonging to this section are numerous. The Virginian deer is the best known. This beautiful species is spread very extensively, ranging from Canada to Cayenne: it tenants the woods in small herds, and its chase is everywhere followed with ardour, so that in a few years the rifle will exterminate it in many districts where it is still common. The three modes of "Still-hunting," "Fire-light hunting," and "Driving," are amusingly described by Audubon in the first vol. of his 'Ornithological Biography.'

In the museum of the Zoological Society, London, there is a fine specimen of the black-tailed deer (*Cervus macrotis*, Say), which inhabits the plains of the Missouri, Saskatchewan, and Columbia; it is numerous in the Quamash Flats which border the Kooskookee river.

It is remarkable for the size of its ears, and the length and fulness of the tail, which is white with a tinge of brown, and largely tipped with black. The general colour is brownish gray. It exceeds the Virginian deer; its height at the shoulders being two feet six inches.

The *Cervus leucurus* is another allied species, which, from its size, form, and habits, has obtained the name of roebuck from the Scottish Highlanders employed by the Hudson's Bay Company, and that of Chevreuil from the French Canadians. It is common in the districts adjoining the river Columbia, and especially the fertile prairies of the Cowalidske and Multnomah rivers. The young are spotted until the middle of the first winter, when they assume the uniform colour of the adults.

Azara describes two species belonging to this section, under the terms Gouazoupoucou (*Cervus paludosus*, Desm.) and Gouazouti (*C. campestris*, F. Cuv.), both natives of Paraguay.

The gouazouti (or guazuti, *Cervus campestris*) inhabits the open Pampas, where it is more than a match for a horse in speed. It stands about two feet six inches in height at the shoulder. The hair is rough, close, and of a reddish bay, the space round the eyes and the under parts of the head and body being white; the hairs of the back are of a leaden gray colour at the base, the tips only being red. The fawns are spotted with white. A most powerful and disgusting odour of garlic proceeds from the males, especially when their horns are in perfection: this odour is not lost in the preserved skin, as we can personally testifiy. "Frequently," says Mr. Darwin, "when passing at the distance of half a mile to the leeward of a herd, I have perceived the whole air tainted with the effluvium." "This deer," says the same clever author, "is exceedingly abundant throughout the countries bordering on the Plata. It is found in northern Patagonia as far south as the Rio Negro (41° N. lat.), but farther southward none were seen by the officers employed in surveying the coast. It appears to prefer a hilly country. I saw many small herds, containing from five to seven animals each, near the Sierra

Ventana, and among the hills north of Maldonado. If a person crawling close along the ground advances towards a herd, the deer, frequently out of curiosity, approach to reconnoitre him. I have by this means killed from one spot three out of the same herd. Though so tame and inquisitive, yet when approached on horseback they are exceedingly wary. In this country nobody goes on foot, and the deer knows man as its enemy only when he is mounted and armed with the bolas. At Bahia Blanca, a recent establishment in northern Patagonia, I was surprised to find how little the deer cared for the noise of a gun: one day I fired ten times from within eighty yards at one animal, and it was much more startled at the ball cutting up the ground than at the report of my rifle. My powder being exhausted, I was obliged (to my shame as a sportsman be it spoken) to get up and halloo till the deer ran away."

9. Subulo.

The Guazus, or Brockets, as they are termed, are distinguished by the simplicity of their horns, which consist of a single slender stem without snags; the suborbital sinuses are small; the nose is pointed, and the naked muzzle small, extending at the side of the nostrils into a glandular spot. The species of this section are small and delicately formed; they inhabit the swampy woods of South America, in small families consisting of eight or ten females, in company with a single male; from which circumstance arose the mistaken idea that this part of the globe possessed deer entirely destitute of horns, while their simple form in the few males seen (for the females are far more numerous) led to the supposition that these were young animals with their first or brocket horns. Hence the term Brocket, adopted as the descriptive appellation of the group. In the museum of the Zoological Society, London, is a specimen of the female of a deer which most probably belongs to the present section. It is described in the 'Proceeds.' for 1831, p. 27, as the *Cervus humilis*, Benn.: it is about

a foot and a half in height at the shoulders, and of a rufous colour, the fore parts having a blackish tinge. The body is stout; the limbs short; the face broad. Mr. Bennett, by whom this species was characterized, "was informed by Captain P. P. King, R.N., that a second skin of the same species had been brought to England by him; that the young was spotted with yellow, and had a yellow stripe on each side of the back; and that the animal was plentiful at Concepcion, and found even as far south as the archipelago of Chiloe, living, he believed, in small herds." Until the horns of the male be known, this species stands only provisionally where we have placed it.

The other known species of this section are the Guazu-pita (*Cervus rufus*, F. Cuv.), the Guazu-bira (*Cervus nemorivagus*, F. Cuv.), and the Apara Brocket (*Cervus simplicicornis*, H. Smith).

80.—Guazu-pita.

The Guazu-pita (*Cervus rufus*).

The Guazu-pita is somewhat larger than a roebuck: its general colour is rufous, with a dusky tint on the face and legs; the lips and chin being white. (Fig. 80.) Azara states that the proportion of males to females in this species is one to ten; and that the fawns are spotted with white. It frequents dense forests, in which it remains concealed during the day, but at night or during the dusk of the evening it ventures into the open lands bordering the woods, and often invades the cultivated fields or gardens of the natives, for the sake of obtaining French-beans, which are a favourite food. Although not destitute of activity, it is soon exhausted, and easily taken, either by dogs or by means of the lasso.

The Guazu-bira (*Cervus nemorivagus*)

is smaller and more delicately formed than the preceding species, which, however, it resembles in general habits and manners, inhabiting also the low moist woods of South America. The colour of this little deer is dusky gray, passing into white on the under parts. (Fig. 81.)

The *Cervus simplicicornis* is a native of Brazil: its colour is rich fulvous, with a dusky ring round the orbits and a spot of the same tint at the angle of the mouth.

10. Styloceros, or the Muntjaks.

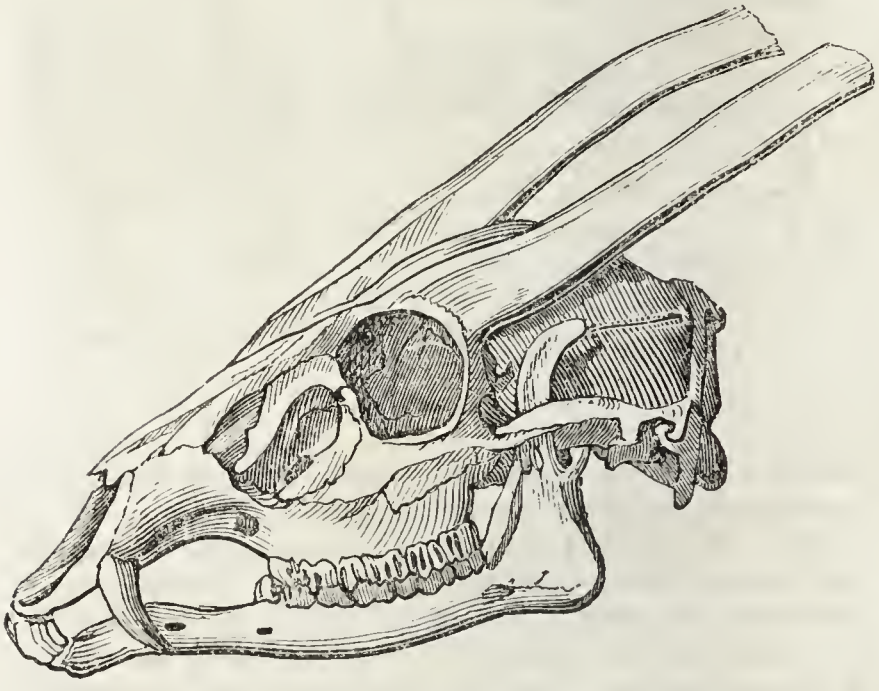
The species of this section are natives of India and the Indian islands, and there is something so peculiar in their physiognomy and appearance, that a glance serves to discriminate between them and all others of the deer tribe. Setting aside the horns, with which the males only are furnished, they remind one strongly of the musk-deer, or chevrotains, though of larger stature. The body, as in the musk-deer, is rounded; the head triangular, and tapering to a fine muzzle; their limbs slender and delicately turned, and their tongue long and flexible. The males, moreover, have long canines in the upper jaw, which protrude beyond the lips. In

81.—Guazu-bira.

manners they are timid and gentle, but are easily domesticated, and soon become familiar.

One remarkable character in the muntjaks consists in the form of the horns, and the manner in which they rise from the forehead, supported on long slender peduncles covered with skin, and turned obliquely outwards, with a tuft of hair along their anterior aspect, becoming very full round the burr of the horn; the hair on the back part and sides of these peduncles is close. These supports for the small horns do not rise abruptly, but are continued from two prominent ridges beginning below the angle of each eye, running obliquely upwards, diverging as they proceed, and constituting an abrupt outline to the flat triangular forehead. (See Fig. 82, the skull of the Muntjak.) These ridges are covered

with the skin of the forehead, which, for the space of nearly an inch on the inner side of each ridge, parallel to the eyes, forms a narrow naked fold, or kind of sinus, capable of being opened or closed at pleasure, and evidently of a glandular nature. When closed these sinuses are hidden by the hair. The horns scarcely, if at all, exceed the peduncles in length ; they are pointed, converge at their points, and have a small rudimentary snag at their base anteriorly. The suborbital sinuses are large and deep, the muzzle is small and naked, the eyes are large and animated, the ears large and open.



82.—Skull of Muntjak.

The first horns obtained are simple, and it is said that there is only one renewal, the second pair being permanent (a doubtful circumstance). As the females want horns, the peduncles and their continuation as ridges down the forehead are absent, but a tuft of hair indicates their situation.

The species composing the present section are but imperfectly known. Colonel H. Smith enumerates five, of

which two at least are doubtful. The most familiar example of the group is the muntjak of Java and Sumatra, the kidang of Horsfield.

The Kidang, or Common Muntjak

(*Cervus muntjak*).

This most elegant and beautiful animal equals a roebuck in size. According to Dr. Horsfield, its favourite haunts in Java are hills covered with brushwood, and elevated grounds adjacent to wild forests, or shrubby districts between the latter and the cultivated grounds. Its voice is so like the barking of a dog as to deceive the ears of persons not familiar to the sound. The food of this species consists principally of the *Saccharum spicatum*, the *Phyllanthus emblica*, and other malvaceous plants abundant in the hilly districts. The muntjak is eagerly hunted, both for the sake of its flesh, which is excellent, and for the sport which the chace affords. Its flight is very rapid, but it generally makes a circle, returning to the spot whence it started. When brought to bay, the male defends itself against the dogs with great courage, using its horns and long sharp tusks with severe effect. It is often taken in snares, and sometimes by riding it down on horseback, and striking it with a sword. This mode is highly dangerous, but is followed nevertheless with the utmost enthusiasm by daring hunters mounted on the naked back of horses trained to the chace, which is conducted with frantic impetuosity.

Dr. Horsfield states that "the muntjak selects for its retreat certain districts, to which it forms a peculiar attachment, and which it never voluntarily deserts. Many of these are known as the favourite resort of our animal for several generations. They consist of moderately elevated grounds, diversified by ridges and valleys, tending towards the acclivities of the more considerable mountains, or approaching the confines of extensive forests. Such districts are by no means uncommon in Java: they are covered with long grass, and shrubs

and trees of moderate size, growing in groups or small thickets, and they generally intervene between cultivated tracts and the deep forests. Their vegetation is peculiarly adapted to afford to our animal a very abundant supply of nourishment; their surface is covered with long grass, *Saccharum spicatum*, well known to persons who have visited the interior of Java by the name of *Allang-Allang*, and the groves and thickets abound with *Phyllanthus emblica*, Linn.; these two plants constitute its principal food. They also produce many species of *Hibiscus*, *Grewia*, *Urena*, and other malvaceous plants, all which are greedily eaten by the kidang. About the middle of the dry season, in the Javanese winter, just before the foliage is renewed, the shrubs and herbaceous plants covering the plains and small woods are, according to an old and universal custom in Java, set on fire; and thus these tracts are prepared for a new vegetation, which appears shortly before the annual rains, in a period that may be compared with an European spring. After the lapse of a few weeks, the ground and shrubs are covered with fresh verdure, and a most abundant supply of food is ready for the kidang. These districts, being in most cases sparingly supplied with water, do not invite an extensive population; the kidang is not molested by a few solitary hamlets, but the leaves of the *Convolvulus batatas*, and of many leguminous and cucurbitaceous plants, which always surround the dwellings of the natives, afford it an occasional repast. Many of these hamlets might be enumerated, which would afford a pleasant recollection to those persons who have visited the native courts or the eastern capitals. Jebres, Kayu-urib, and Pring-ombo near Surakarta, and Kali-wungu near Samarang, are among the most favourite. The native inhabitants of the hamlets dispersed through the districts in which the kidang is found do not possess means to undertake the chace; but it affords amusement both to Europeans and natives of rank, who engage in it in different modes with great ardour. The *Cervus muntjak* has a strong scent, and is easily tracked by dogs. When pursued, it does not go off, like the stag, in any acci-

dental direction: its flight indeed is very swift at first, but it soon relaxes, and, taking a circular course, returns to the spot from which it was started. The natives, acquainted with the character of our animal, describe it as possessing a great portion of craftiness, combined with much indolence. After several circular returns, if the pursuit be continued, the kidang thrusts it head into a thicket, and in this situation remains fixed and motionless, as in a place of security, and regardless of the approach of the sportsmen. If it remains unobserved, it is still unwilling to quit its haunts; and experienced hunters, acquainted with its natural disposition, after an unsuccessful pursuit, return the following day, and in many cases find the kidang near the same spot. The chace of the kidang, by means of dogs, affords occasionally a favourite amusement to the natives of rank in Java. Many of these, especially in the more distant provinces, keep large packs for this purpose, which are regularly trained. The dogs, vulgarly denominated pariahs, are the indigenous breed of the island, in a state of imperfect domestication: there are several varieties; one of these greatly resembles the Sumatran dog, of which a description, accompanied by a figure, is given by General Hardwicke, in the 13th volume of the Transactions of the Linnæan Society. The body is lank, and the ears erect: they are ferocious in their disposition, and rarely show any attachment to their masters. The natives of Java, like other Mahommedans, entertain prejudices unfavourable to dogs: they rarely treat them with kindness, or allow them to approach their persons; and it is only in extraordinary instances, or when they contribute to their amusement, that they feed or care for them; generally they are ill-treated, and left to provide for themselves, so that their famishing condition is disgusting to Europeans. Many of these dogs are extremely ardent and courageous in the pursuit of the kidang: when the chace commences, they are led with a line by an attendant to the spot: the peculiar exhalations soon discover the kidang; the dogs are discharged, and commence the pursuit with great ardour, while the sportsman fol-

lows more deliberately, and generally finds the dogs at bay with the kidang. The male animal possesses a great share of courage, and with its tusks makes a most vigorous defence: many dogs are wounded in the attack. The sportsmen uniformly are provided with remedies and applications, and by a simple suture attempt to unite those wounds which are not immediately fatal. In this operation they frequently succeed, and preserve their most valuable dogs; but in many cases the kidang makes fatal lacerations in the neck and breast, or lays open the abdomen. But although possessed of great courage, the life of the kidang is not tenacious, and the sportsman, on arriving at the spot, generally despatches it with small shot. The natives of the most distant districts are in the habit of bringing their best dogs to the capitals, on occasion of their half-yearly attendance, to perform the feudal services to the sovereigns, when their sports afford an occasional amusement to the European inhabitants. Other modes of chace are also employed by the natives of rank. One in particular is common in the western parts of the island: a district is surrounded by a line of hunters, and the kidang is driven in towards a central spot: forty or fifty animals are in this manner often obtained at a single pursuit. Many of the hunters are mounted, and the horses are trained to the chace. The sportsman endeavours to overtake the animal, and to kill it by a stroke with a sword. The inhabitants of Pugar and Blambangan, two provinces at the eastern extremity of Java, possessing a small population, but abounding in extensive plains and acclivities, which afford an ample range and abundant pasture to the kidang, are particularly skilled in this sport. The best horses are trained for it: the sportsman, without a saddle, mounts on the naked back, and carries on the pursuit with a frantic impetuosity, at the risk of his limbs and neck. During my visit to these districts, I was frequently entertained by aged natives with narratives of their favourite sport, and of the dangers and accidents they had encountered on many occasions; but these had not diminished their ardour for this amusement. The

native stag of Java is pursued in the same manner. In Banka a less arduous but more destructive method is employed to take the kidang; a long rope of rattan is suspended, at a proper height above the ground, between two trees; numerous nooses, of the same material, hang from this, in a close and continued series, and the kidang, driven towards it, pursued by dogs and blinded by fear, does not perceive the slender rattan, and, thrusting his head into a noose, is strangled on the spot. The kidang has other enemies and pursuers besides man: the tiger and leopard also approach its retreat, and many are annually destroyed by them. But in a mild climate a constant and regular supply of food abounds, and no

83.—Muntjak.

great variation or decrease is observed in their number. The kidang is impatient of confinement, and is not fitted for the same degree of domestication as the stag. It is however occasionally found in the enclosures of natives and Europeans, but requires a considerable range to live comfortably: it is cleanly in its habits, and delicate in its choice of food. The flesh affords an excellent venison, which is often found on the tables of Europeans. The natives eat the males, and always present them in a conspicuous place in their feasts; but in consequence of some peculiarities in the habits of the females, they have an aversion to them as food."

The general colour of this species is bright reddish brown, the under parts being white. (Fig. 83.)

Colonel Sykes observed a species of muntjak in the Ghauts of the Deccan, which he states to be never seen on the plains. It is termed Baiker by the Mahrattas. Mr. Hodgson notices a species called Katwa, proper to the central region of Nepâl, but occasionally occurring in the lower valleys of Kachar. A species from China is described by Mr. Ogilby under the title of *Cervus Reevesii*.

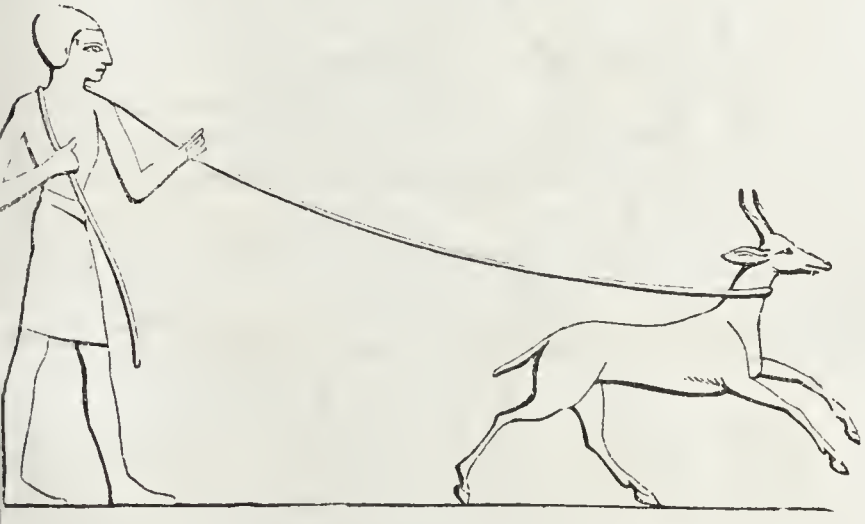
HOLLOW-HORNED RUMINANTS.

1. Antelopes.

The word antelope (*antilope*), now so generally used, is of very uncertain origin. It appears first to have been adopted as the designation of a species, but was subsequently given by Pallas as the title of a genus. The first occurrence of the word Ανθολοψ is in the 'Hexameron' of Eustathius (fourth century), as the name of an apparently fabulous animal. Bochart supposes it to be derived from the Coptic Panthalops, which signifies the unicorn; but it may be derived from the Greek Ανθος, a flower, and Ωψ, the eye, or οπτομαι, to see, in allusion to the brightness and beauty of the full beaming eyes which are so remarkable in most of these animals, and which have often rendered the gazelle the theme of the Persian and Arabian poets. The name of the

gazelle, *dorcas*, from δερκω, or δερκομαι, to see, was a common name for women among the Greeks and Romans.

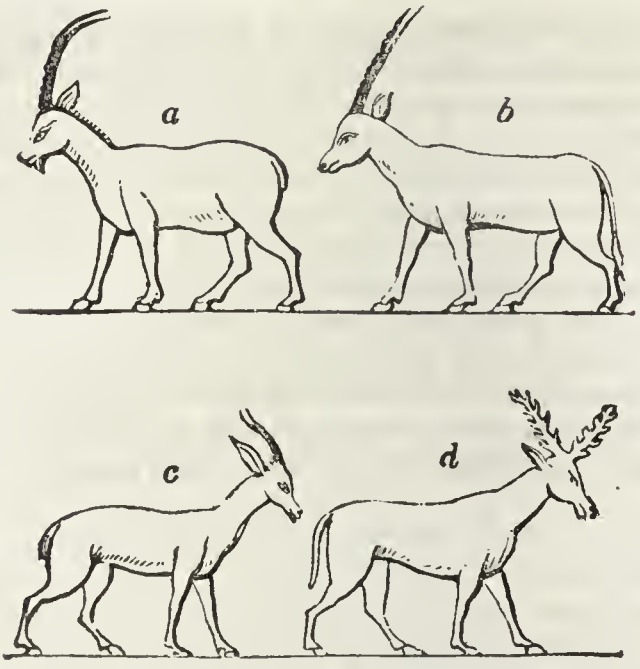
It is interesting to trace the acquaintance which the ancients had with objects of natural history, as demonstrated by their drawings or sculptured representations: nor is the examination of them unimportant; they often supply us with a hint as to the ancient geographical distribution of animals, or as to facts connected with their history, and prove that many hundred years past the species existed with the same forms and characters as at the present time. It is therefore not out of place to draw our readers' attention to some figures in outline from the Egyptian sculptures. Fig. 84 represents a gazelle caught



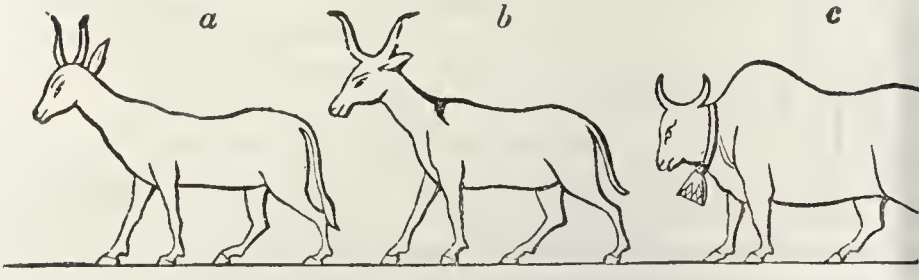
84.—Gazelle caught in lasso. (Egyptian.)

by the noose or lasso, an instrument used by the ancient Egyptians and by the modern Gauchos of South America. Fig. 85: *a*, Ibex; *b*, *Antelope leucoryx*; *c*, Gazelle; *d*, a species of Stag. Fig. 86: *a*, Antelope; *b*, Goat; *c*, Aoudad or Kebsch (*Ovis Tragelaphus*, Desm.), found in the mountains along the Nile, and on the northern coast of Africa.

The section or family to which the title of Antelope (*Antilope*) is ordinarily given embraces, it must be confessed, a somewhat ill-assorted assemblage, requiring to



85.—Animals from Egyptian Sculptures.



86.—Animals from Egyptian Sculptures.

be distributed into several distinct genera. The fact is that every hollow-horned ruminant, which is neither one of the sheep, goats, nor oxen, has been assigned to the antelopes, and hence the diversities of form and habits which we see among the members of this extensive group. Mr. Ogilby ('Zool. Proceeds.,' 1836, p. 132) makes the remark, that "the genus Antelope has become a kind of zoological refuge for the destitute, and forms an incongruous assemblage of all the hollow-horned

ruminants, which the mere shape of the horns excluded from the genera *Bos*, *Ovis*, and *Capra;* thus it has come to contain nearly four times as many species as all the rest of the hollow-horned ruminants together. So diversified are its forms, and so incongruous its materials, that it presents not a single character which will either apply to all its species, or suffice to differentiate it from conterminous genera."

In analyzing and re-arranging the antelopes, Mr. Ogilby draws his characters from the horns, the form of the upper lip, whether modified for grazing or browsing, the existence of lachrymal sinuses, inguinal sacs, and interdigital pores, and the number of the teats in the female. With respect to interdigital pores, he observes that their existence or non-existence is an important point, as their use appears to be to lubricate the hoofs by a fluid secretion: hence are they connected with the geographical distribution of the species, confining them to the rich savannah or the moist forest, or enabling them to roam over the arid mountain, the parched karroo, and the burning desert. Among the antelopes, then, there are, on the one hand, species allied to the goats and sheep; on the other, to the oxen; and as widely differing in form and appearance from the gazelle or the Indian antelope as does the wild bull or the ibex.

But we must not forget, nor do we forget, that our object is not to enter into the minutiæ of scientific disquisitions, fit only for the pages of works devoted to the more abstruse departments of Zoology. Were we to follow our feelings, we should expatiate on this part of the subject more perhaps to our own gratification than that of our reader: we shall therefore forbear; and, allowing the family termed Antelope to remain as it does, we shall merely divide it for the sake of perspicuity into four subdivisions, namely:—True Antelopes, Bush Antelopes, Capriform Antelopes, and Boviform Antelopes.

The antelopes differ essentially from the deer in the structure of the horns. In the deer the horns, or more properly antlers, are deciduous; but in the antelopes,

and the same observation applies to the goat and ox, these organs consist of a horny sheath, investing a conical support of bone; their increase is gradual, and they are not yearly shed and renewed. The bony central support, or core, is a process from the frontal bone: in most antelopes it is solid, or nearly so; it commences small at first, and assumes various directions in the various species. One antelope has four horns. The horny sheath consists of fibres analogous to those of whalebone, or rather hair, running longitudinally or spirally, and agglutinated into one uniform mass. If this sheath be stripped from its bony core, the latter will be found covered by a highly vascular periosteum, from which the fibres in question are secreted. They are formed in regular succession as the bone grows, so that the horn which covered the whole process or core in the young animal will in due time be thrown to its summit. The outermost layer was once in contact with the core, but was gradually pushed outwards and upwards. In some groups of antelopes both sexes are furnished with horns, in others only the male: and it is difficult in many cases to discriminate between the hornless females of one of the antelope and of one of the deer tribe. It is chiefly to the warmer latitudes that the antelopes are confined, and Africa may be regarded as their great nursery; many, however, are Asiatic; the Saiga and the Chamois are natives of Europe; the Prongbuck and a closely-allied species (if they can be called antelopes) are natives of America.

True Antelopes (*Gazella*, Ogilby).

Horns in both sexes; lachrymal sinuses distinct and moveable. Interdigital pits and inguinal pores large. Female with two teats. Horns lyrate.

The Ariel Gazelle (*Antilope Arabica*).

This beautiful species inhabits Arabia and Syria, where it is seen in large herds (Fig. 87), bounding over the desert with amazing fleetness. Its eyes are peculiarly

87.—Group of Ariel Gazelles.

large, dark, and lustrous, and have supplied a simile to the Oriental poets and orators; indeed, to say of a woman "she has the eyes of a gazelle," is a most flattering commendation. The Ariel antelope is an object of the chace in Arabia, as it was among the ancient Egyptians, whose delineations of it are abundant. Its flesh is said to be excellent. So swift are these animals, that the greyhound unaided cannot overtake them; the falcon, therefore, is brought into service. The huntsman advances as near as possible to the herd, the dogs are then slipped, and the falcon thrown off; the individual which the dogs have singled is attacked by the falcon, which is trained to strike at the head and eyes, so as to confuse the game, and check its speed, thereby enabling the dogs to come

88.—Tame Gazelle.

up to it. It is a common practice to shoot the gazelle. Burckhardt informs us that on the eastern frontier of Syria are several places allotted for the hunting of this animal, or rather for its entrapment and destruction. An open space on the plain, about one mile and a half square, is enclosed on three sides by a wall of loose stones, too high for the gazelle to leap over. Gaps are left in different parts of the wall, and at each gap a deep ditch is sunk on the outside. The inclosure is situated near some

83.—Ariel Gazelle, with the Jerboa and Syrian Goat.

rivulet or spring to which the gazelles resort in summer. When the sport is to begin, many peasants assemble and watch till they see a herd of gazelles advancing from a distance towards the enclosure, into which they drive them. The gazelles, frightened by the shouts of the people and the discharge of the fire-arms, endeavour to leap over the wall, but can only effect this at the gaps, where they fall into the ditch outside and are easily taken, sometimes by hundreds. The chief of the herd always leaps first, and the others follow him one by one. The

90.—Ariel Gazelle.

gazelles thus captured are immediately killed, and their flesh sold to the Arabs and neighbouring Fellahs. Of the skin a kind of parchment is made, and used to cover the small drum with which the Syrians accompany some musical instruments or the voice. When taken young, wild and timid as the gazelle is, it is readily tamed, and becomes familiar and quite at ease. (Fig. 88.) Tame gazelles are frequently seen at large in the courtyards of houses in Syria, and their beauty, exquisite form, and

91.—Ariel Gazelles.

playfulness render them great favourites. The Ariel gazelle is about one foot nine inches high at the shoulder; its limbs are slender, but vigorous; and all its actions are light and spirited. (Fig. 89.) In full flight it lays the horns back almost on the shoulders, and seems to skim over the level plain, almost without touching it.

The general colour above is dark fawn or yellowish brown; the under parts are white, divided from the colour of the upper parts by a black or deep brown band along the flanks; the nose has a broad mark of dark brown, and on each side of the face a broad stripe of white passes from the horns over the eyes to the nose, while a narrow stripe of black, from the inner angle of the eye to the nose, separates the white streak from the fawn-colour of the cheeks; the knees are furnished with dark brushes of hair. (Figs. 90 and 91.)

A closely allied species, the Ahu or Tseyran (*A. subgutturosa*) is common in Persia and the country round Lake Baikal. Whether it be truly a distinct species or only a mere variety of the Ariel gazelle remains to be decided. It is hunted in Persia with greyhounds and falcons, which mutually assist each other.

92.—Dorcas Gazelle.

93.—Dorcas Gazelle.

The Dorcas Gazelle (*A. Dorcas*).

This species differs from the Ariel gazelle chiefly in being of a much lighter colour, presenting, however, the same markings and arrangement of tints. It is a native of Northern Africa, and lives in large herds upon the borders of the Tell, or cultivated country, and the Sahara, or desert. When a troop of these gazelles are pursued, they fly to some distance, then stop, turn round and gaze at the hunter, and again take to flight. If hard pressed they disperse in different directions, but soon reunite; and when surrounded and brought to bay, they defend

themselves with spirit and obstinacy, uniting in a close circle, with the females and fawns in the centre, and presenting their horns at all points to their enemies. This gazelle is the common prey of the lion and panther. (Figs. 92 and 93.)

Another gazelle (perhaps a variety), called the Kevel (*A. Kevella*, Pallas), resides in vast flocks on the open stony plains of Senegal.

The Blessbok (*Antilope Pygarga*).

Southern Africa is the native country of this fine antelope, which is also called Bontebok, or Painted Goat, by the Dutch colonists. It is superior in size to the stag of Europe, exceeding, when adult, three and a half feet in height at the shoulder. The horns are sixteen inches long, large, and regularly lyrated.

The blessbok was once very common within the districts of the Cape Colony, where in some parts it still exists, but not in such multitudes as formerly, when it was said to cover the plains in troops of thousands. In the country beyond the colonial borders it is tolerably abundant. The blessbok is fleet and active; and its markings are very ornamental. The colours of the head and body are most singularly disposed; the whole animal appears as if it had been artificially painted with different shades, laid on in separate masses. The head and neck are of a brilliant brownish bay, so deep as to resemble the colour of arterial blood: this is particularly visible upon the cheeks and about the root of the horns, from the central point between which descends a narrow stripe of the purest white as far as the orbits, immediately above which it expands and covers the whole face and nose down to the muzzle, forming a broad mark, or, as it is called in horses, a blaze, and giving origin to the name of blessbok, or blazebuck, by which this species is known among the Cape colonists. The back is of a brownish bay, thickly overlaid, or, as it were, glazed or japanned with dull purplish white, and there is a very broad purplish brown band on the flanks passing from the fore-arm

94.—Blessbok.

backwards, and extending obliquely over the outer face of the thighs. The breast, belly, and interior of the fore-arms and thighs are white, and this colour also shows itself on the posterior face of the hips and thighs, and passes in a small crescent over the rear of the croup, forming a white disc around the tail, and giving origin to the specific name of *Pygarga*, which has been rather arbitrarily bestowed upon this animal, the real Pygarga of the ancients being certainly a different species, and an inhabitant of Northern Africa. The tail is long and switched, nearly naked at the root, and terminated by a tuft of very long black hair. The knees are without brushes. The young are at first of a brownish red colour on the body, partially glazed, as in the adults; but what is most remarkable of

all is, that the face, instead of being white as in the grown animal, is of a very deep brownish black colour, slightly mixed with scattered gray hairs.

It was from a young animal that our engraving (Fig 94) was taken.

Sœmmering's Antelope (*Antilope Sœmmeringii*).

This light and graceful antelope, which exceeds the Ariel gazelle in size, is a native of Abyssinia, where it was discovered by Rüppel during his journey through the northern provinces of that country, and afterwards described by Cretzchmar in the zoological portion of Rüppel's account of his travels.

It frequents hilly districts, but is not gregarious, like the common gazelle: it lives in pairs, and is fleet and vigorous. Beyond these points we know nothing of its history. The horns of this elegant antelope are regularly lyrated, bending boldly outwards towards the points, and then suddenly turning inwards towards one another, with a very sharp and well defined curve; they are annulated with fifteen or sixteen prominent and complete rings, which reach from the base to the inward curvature within about two inches and a quarter of the points. The general colour is a beautiful clear Isabel or yellowish dun, the hair being extremely short, and appearing almost as if it had been clipped or shorn. It does not lie close and smooth upon the hide, nor does it all follow the same direction, as in the generality of animals, but is disposed in innumerable small waves, pointing in different directions, as if it had been regularly shaded and parted on each side, and appearing glossy or glazed along their ridges with a shining dun shade, more or less intense according to the light in which it is observed. All the under parts of the body are abruptly of the most pure and brilliant white, and a large disc of the same colour surrounds the tail and passes over the rump and croup. The tail is small and slender, nearly naked at the root, and furnished at the extremity with a tuft of mixed brown and gray hairs. The outsides of the legs are very

95.—Sœmmering's Antelope.

pale fawn colour, the insides white, and the knee-brushes white and fawn mixed. The ears are pretty long, and brown, with a narrow black border surrounding their outer edge. The face is dark brown in some specimens, and pure black in others, curiously mixed with wavy red on the forehead; on each side of this a broad white band passes from the root of the horns over the eyes to the nose, and there is an indication of a small black one from the anterior angle of the eye to the corner of the mouth, separating this white band from the cheeks and sides of the lower jaw, which are uniform fawn colour. The horns of the female have nearly the same curvature as

those of the male, and are fully as long, but they are much more slender, and have not such prominent annuli. (Fig. 95.)

The M'horr (*A. Mhorr*, Bennett).

The M'horr is a native of Wednoon, twelve days' journey inland from Mogadore, whence some years since two living specimens were sent to the gardens of the Zoological Society, London. The species is described and figured by Mr. Bennett in the 'Zool. Transactions.' Of its habits we have no account. Its general colour is deep fulvous or reddish brown, becoming paler on the sides of the face and passing into white about the eyes,

96.—M'horr

nose, lips, and lower jaw ; an irregular black mark between the eyes and the mouth. A square mark midway on the front of the neck ; the under parts, croup, back of the thighs, tail, and inside the limbs are abruptly white ; the tail has a fringe of black hairs at its termination ; the horns are somewhat lyrate, and strongly annulated, and after bending back suddenly curve forwards, the points being hooked. Height at the shoulder two feet six inches. (Fig. 96.)

The Springbuck (*Antilope Euchore*).

Among the true antelopes this species is one of the most graceful and beautiful ; and its movements are light and rapid. It is a native of the wild karroos of South Africa, where it lives in vast troops, which are irregularly migratory. Its name springbuck (springbok) is given in allusion to its singular habit of leaping perpendicularly when alarmed or as it scours the plain, and that to the height of several feet. Mr. Burchell well describes the effect produced by large herds of these interesting creatures spread over an extensive plain, intermingled with troops of gnus and quaggas. Two thousand springbucks seen at one view must, indeed, have been a noble spectacle. The plain, he says, "afforded no other object to fix the attention, and even if it had presented many, I should not readily have ceased admiring these elegant animals, or have been diverted from watching their manners. It was only occasionally that they took those remarkable leaps which have been the origin of their name ; but when grazing or moving at leisure they walked and trotted like other antelopes or the common deer. When pursued or hastening their paçe, they frequently took an extraordinary bound, rising, with curved or elevated backs, high into the air, generally to the height of eight feet, and appearing as if about to take flight. Some of the herds moved by us almost within musket-shot, and I observed that in crossing the beaten road the greater number cleared it by one of those flying leaps." The most remarkable point in the histoy of the springbuck,

relates to its habits of migration. The karroos, or vast wilds in the interior of Southern Africa, where this animal resides in almost incredible multitudes, are subject to seasons of drought, in which the pools are dried up, the pasturage burnt by excessive heat, and every green leaf or blade withered. Driven by necessity, all the animals hurry from this scene of barrenness; and of these the springbucks are in myriads. They literally inundate the fertile districts, over which swarm after swarm passes like wave after wave, destroying the hopes of the colonists. The grazier drives his flocks and herds to a distant pasturage, dispossessed of his lands till the heavy rains set in; the corn-lands are ruined for the season, and the line of their march is one broad track of desolation. It is not with impunity, however, that the springbucks make these forced incursions. The gun of the colonists thins their numbers: and lions, hyænas, and jackals follow in their train, and prey incessantly upon them. When the rains begin to fall, the horde, thinned by man and beast, begins to return to the interior, and in a few days the whole have disappeared. These migratory swarms are called by the Dutch colonist trek-bokken. Mr. Pringle once passed through one of them, near the Little Fish river; he could not profess to estimate their numbers: they whitened, or rather speckled, the country as far as the eye could reach; there could not have been less in view than twenty-five or thirty thousand. The springbuck is shot in great numbers by the Dutch boors. This sport is usually pursued on horseback, and in the heat of the day. The animal is then lying in its habitual lair, and on being disturbed by the sportsman, springs away with a succession of bounds, than which nothing can be more beautiful or graceful. The Dutch boor is generally an unerring shot; but in case the antelope should be only wounded, the buck-dog (a species of large mongrel) is always at the heels of his master's horse, and, at the report of his gun, darts forward and secures the animal. It is then placed behind the saddle, and conveyed away.

The general colour of the springbuck is light cinnamon-red, a band of deep reddish brown passing along

the sides and edging the pure white of the under surface. On the croup is a large patch of long white hairs enclosed by a fold of skin on each side, the edges of which approximate when the animal is quiet, so as to reduce the white to a mere line. In the act of leaping these folds are widely opened, and the long white hairs spread beautifully out, so as to cover the whole of the haunch, producing a striking effect. When taken young the springbuck is easily tamed, and becomes playful and familiar, displaying the confidence and even petulance of the goat, and using its horns in butting, either sportively or in earnest.

ANTILOPE, Ogilby.—*Horns in the male only; lachrymal sinuses mobile and distinct; interdigital pores large; inguinal pores large; teats in the female, two; horns annulated and spiral.*

THE INDIAN ANTELOPE (*Antilope Cervicapra*).

The saisin, or common antelope of India, is spread over almost every part of that country, residing on the open plains in large herds of females and young, under the guidance of a single old male. They are extremely wary and cautious, and when feeding or lying down to ruminate are guarded by sentinels (young bucks), who give the alarm on the slightest appearance of danger. Their fleetness and activity are such, that greyhounds are useless in the chace. Captain Williamson assures us that he has seen a buck antelope lead a herd of females over a net at least eleven feet high, and that they frequently vault to the height of twelve or thirteen feet, and pass over ten or twelve yards at a single bound. The flesh of this species is dry and unsavoury, but the animal is often hunted, for the sake of the sport, by means of trained chetahs, as described in the history of the latter. (See *Felidæ*, vol. i, p. 55.)

The Indian Antelope is about two feet and a half in height at the shoulder, and is lightly formed, but endowed with great vigour. The adult males are of a

97.—Indian Antelope.

blackish brown above, and white beneath, the nose, lips, and a large circle round each eye being likewise white; the hair is short and close; the knees are furnished with tufts or brushes. (Fig. 97.) The horns have two or more spiral turns, and are strongly annulated; the Fakirs and Dervishes polish them and form them into offensive weapons by uniting them at the base, so that they are pointed at each end; these they wear in their girdles, instead of swords and daggers, which their vows and religious character prevent them from using. The young males, and also the females, are of a tawny brown, with a streak of silvery gray along each side.

The Pallah (*Antilope Melampus*).

This magnificent antelope is a native of South Africa, where it was discovered by Lichtenstein. It inhabits Caffraria and the country of the Bachapins, never descending farther south than the Koosges valley in one direction and the Kamhanni mountains in the other. This species associates in families of six or eight individuals, always residing on the open plains : their swiftness is astonishing, and they leap with great vigour and much in the manner of the springbuck. They are very numerous on the elevated plains in the neighbourhood of Lattakoo. where the natives choose them for the sake of

98.—Pallah.

their flesh, which, though deficient in fat, is much esteemed. The Pallah (as it is called by the Bachapins) stands three feet high at the shoulder. The general colour is deep rufous; the lips, eyebrows, interior of the ears, all the under parts, the inside of the limbs, and the region below the tail, are white: a black crescentic mark on the croup separates the white from the rufous colour on the back; the outside of the heel and knee are marked by black spots: the horns have an irregular lyrate tendency, bending first forwards and very much outwards, then with a large circular sweep inwards, and finally pointing forward again, approaching within three inches of one another at the tips, after being nearly a foot distant in the middle; they are about twenty inches long in adult animals, and surrounded for two-thirds of their length with irregular rings, often splitting into two, and forming prominent knobs on the front of the horn, but frequently obliterated, and always less strongly marked on the sides, which are slightly compressed. (Fig. 98.)

Madoqua, Ogilby.—*Horns only in the male. Lachrymal sinuses distinct, but small. Interdigital pits distinct. Inguinal pores wanting. Teats in the female, four. Horns straight.*

The Madoqua Antelope (*Antilope Saltiana*).

This beautiful little antelope, which scarcely equals a hare in magnitude, is a native of Abyssinia, where it was first discovered by Bruce about the sources of the Abawi, or eastern branch of the Nile. Specimens are in the British Museum and in that of the Zoological Society, London. Of its habits little is known: it is said to live in pairs in mountainous districts, and Pearce informs us that many of the Abyssinians object to eat its flesh, from superstitious motives, because, as they assert, it is often found in the society of monkeys and baboons.

The height of this species at the shoulder is about fourteen inches; the horns are sharp and slightly bent outwards and forwards; the face, forehead, and legs, as

well as the tuft of long hair between the horns, are of a bright and deep red, as are likewise the backs of the ears; the neck, shoulders, flanks, rump, and outsides of the thighs are of a clear gray colour, like that of the American gray squirrels, each hair being annulated with alternate rings of black and white; the back, from the shoulders to the rump, is a deep reddish brown, and the breast, belly, interior of the fore-arms and thighs, and hinder surface of the hips, of the most pure unmixed white, forming altogether a variety, clearness, and brilliancy of colouring rarely met with among quadrupeds; the tail is very short, being in fact little more than a mere stump; the ears are round and nearly the length of the horns; the hoofs small, well formed, and, like the horns, of a

99.—Madoqua.

deep black colour; the forehead is perfectly flat, and the head is compressed suddenly below the eyes, and tapers to a small and attenuated snout; the legs are long in proportion to the weight of the body, and so small that they scarcely equal the little finger in thickness. (Fig. 99.)

ELEOTRAGUS.—*Horns with a single curve, bending forwards more or less decidedly towards the points, or straight—none in the female. Suborbital sinuses wanting; inguinal pores large; muzzle naked.*

THE REITBOK, OR REEDBUCK (*Antilope Eleotragus*).

The interior of South Africa is the abode of the Reitbok, where it is by no means uncommon, living in pairs or small families, and frequenting the reedy banks of mountain-streams which are dried up during the heat of summer. Sometimes it is found along the borders of the rivers in dense woodland solitudes: plants growing in humid or marshy situations are its food.

The Reitbok is about two feet ten inches high at the shoulder. The hair over the neck and body is long and rough, and of a dull ashy gray, sometimes tinged with red; the under parts and inside of the limbs are silvery gray. The tail is long and bushy. Beneath the ears on each side of the head is a naked oval space of a shining black colour. The horns curve forwards very boldly, and are annulated at the base with prominent rings. (Fig. 100.)

BUSH ANTELOPES.

The animals so termed are of a compact form and low in the limbs, which are slender, but vigorous. The hair is smooth and usually close; the neck is short, and held almost horizontally, and the back is arched. The horns are straight and short, and situated high on the head, at a considerable distance from the eyes; in one sub-genus they are possessed by females as well as males. There is no suborbital sinus, but its absence is compensated for

100.—Reitbok.

by a long maxillary gland running down each side of the face between the angle of the eye and the muzzle, indicated by a naked space on the skin, of a black colour, and moistened by a peculiar secretion. These animals live singly or in pairs, frequenting jungles, dense reed-beds, and the underwoods of forests, most preferring hills or mountain-districts of moderate elevation. When pursued, they dive through the thicket, and quickly disappear.

Tragulus, Ogilby.—*Horns in both sexes; maxillary glands oblong; interdigital pores wanting; inguinal pits wanting; teats in the female, four.*

The Kleenbok (*Antilope Perpusilla*).

This little antelope is a native of South Africa, and lives singly or in pairs among the bushes, in the covert of which it hides itself so completely, that it is not often to be seen even where it is abundant. It is very active, shy, wary, and timid, and displays great address and cunning in eluding pursuit. When domesticated it becomes very familiar, will distinguish persons about it, and answer to its name when called. This species is the *A. pygmæa* of Desmarest, who confounds it with the Guevi of Senegal: it is also the *A. cærulea* of Col. H. Smith.

The height of the Kleenbok at the shoulder is about a foot; the head is long and pointed. The general colour

101.—K'eenbok.

is dark slaty brown, passing in the under parts to ashy gray; the forehead and nose are brown bordered on each side by a line of sandy red; the legs are reddish brown; the horns are small and straight, not more than an inch and a half long in the male; nearly an inch in the female. (Fig. 101.)

CAPRIFORM ANTELOPES.

Head heavy; neck short; contour robust; limbs strong; hoofs adapted for rocky or mountain situations; horns small or moderate; hair coarse and deep, or harsh and wiry.

RUPICAPRA.—*Horns common to both sexes, rising immediately above the orbits, at first vertically, then looking abruptly backwards, small and smooth, with sharp points; lips hairy and attenuated; suborbital sinuses wanting; inguinal pores and post-auditory sinuses; teats of females, two.*

THE CHAMOIS (*Antilope Rupicapra*).

This celebrated animal is found in all the alpine chains of Europe and Western Asia, in the Alps, the Pyrenees, the Carpathian and Grecian mountains, and the ranges of Caucasus and Taurus. Everywhere it tenants the loftiest ridges, displaying the most astonishing activity. During the summer it is only to be found on the mountain-tops, or in sequestered rock-girt glens, where the snow lies unmelted throughout the year; but in winter it descends below the line of perpetual snows to the grassy slopes, where it becomes doubly cautious and wary. Its senses of hearing, sight, and smell are extremely acute, and it scents the approaching hunter at the distance of half a league. (Fig. 102.) When its fears are once excited, it bounds from rock to rock, as if to gain a view of the surrounding district, uttering at the same time a singular hissing sound; but no sooner has it caught sight of its enemy, than off it bounds, scaling the most fearful rocks, clearing chasms, and leaping from crag to crag

102.—Chamois.

with amazing rapidity. Its course is not stopped by a perpendicular precipice of twenty or thirty feet in depth: with astonishing boldness it takes the leap, striking the face of the rock repeatedly with its feet, for the purpose both of breaking the fall, and of directing itself more steadily to the point it aims at. It pitches on the smallest ledge, where the eye of man scarcely discerns room for its foot; and it traverses with security the beetling shelf that overhangs the deepest abyss. The perils of the chamois-hunter have been too often narrated to need repetition; his life is one of perpetual jeopardy: he is like a man infatuated by a spell, and though he knows the awful risk he runs, yet to the chase is he impelled

by the same feelings which urge the gamester in a career of ruin. The sketch (Fig. 103) represents the dangerous situation of two celebrated hunters in 1826, and is copied from a print published at Basel.

The food of the chamois consists of mountain herbs and flowers, and the tender shoots of shrubs; it seldom drinks, but is extremely partial to salt, and many stones are met with in the Alps hollowed out by the continual licking of the chamois, on account of the saltpetre with which they abound.

103.—Chamois hunters.

104.—Chamois.

At the root of each horn on the back of the head there is a sinus or opening of the skin, which does not seem to be connected with any gland, nor is its use understood. The females produce one kid, rarely two, in March or April. The chamois exceeds two feet in height: the whole body is covered with long hair of a deep brown in winter, and brownish fawn-colour in summer; the chaffron, muzzle, and sides of the lower jaw are white or straw-coloured; the tail is very short, (Fig. 104.)

Mazama, Ogilby.—*Horns in the male only, compressed laterally at the base, diverging as they rise upwards, then hooking backwards and inwards, rough and scabrous, and giving off above their base a bold, compressed, pointed prong directed forwards; lips hairy; neither in-*

guinal pits nor lachrymal sinuses; interdigital pits distinct; teats in the female, four; knee-brushes large; accessory hoofs wanting.

The Prongbuck (*Antilope Furcifer*).

The Prongbuck is a native of the western parts of North America, from the 53° of north latitude to the plains of Mexico and California; presuming that it is identical with the animal described by Hernandez as the Mazama. It is gregarious in its habits, frequenting wide open plains or hills of moderate height, but is never found to inhabit forests or closely-wooded districts. It migrates from north to south, according to the season. On the banks of the southern branch of the Saskatchewan and on the upper plains of the Columbia river it is very numerous. The prongbuck is compactly formed, active, and vigorous; and, on firm ground, will outstrip most animals, but after a slight fall of snow a good horse will easily overtake it. These animals, like many other Ruminants, display a sort of stupid curiosity at the sight of novel objects, which, as Dr. Godman states, the Indians, and even the wolves, turn to their own advantage. If they crouch down, assume strange postures, now move forwards, now stop, or play antics, the prongbucks wheel round and round the object of their attention, decreasing their distance at every turn, till at last they approach near enough to be killed by the Indian, or sprung upon by the wolf. Their flesh, however, is not in any estimation, and it is only in times of scarcity that the Indian will take the trouble of hunting them. The females produce one or even two kids early in the month of June. The prongbuck stands three feet in height at the shoulder: its body is covered with closely compacted hair standing out from the skin, and of a most singular texture; it is tubular, or hollow like a quill, but so brittle and devoid of elasticity that it snaps with the smallest effort, and when pressed between the thumb and finger crushes like a dry reed, and never regains its original form; on the head, ears, and legs the fur is close and of

105.—Prongbuck.

the ordinary quality; that on the body is two inches long, but down the back of the neck it is six inches in length, and forms a mane. The general colour is pale fawn, the hairs being of a bluish tint at the roots; the under parts and inner aspect of the limbs are white; a broad disc of white surrounds the tail, and passes over the croup; and the throat is marked also with two transverse white bands. (Fig. 105.) This, it must be observed, is the winter dress of the animal; in summer the new coat which it then acquires consists of hair of the ordinary quality, which as the winter comes on gives place to the covering described.

NEMORHEDUS, Smith.—*Horns short, parallel, curved gently backwards, annulated at the base and longitudinally striated; in both sexes, muzzle naked. Suborbital sinuses in the form of a circular orifice. Neither inguinal pores nor knee-brushes. Limbs stout. Fur harsh and wiry; a nuchal mane. Teats four.*

THE CAMBING-OUTAN, OR WILD GOAT OF THE MALAYS

(*Antilope Sumatrensis*, Desm.).

In aspect and manners the Cambing-outan resembles the common goat and the ibex; it inhabits the forests which clothe the mountains of Sumatra, and is bold and active. The Cambing-outan stands about two feet three

106.—Wild Goat of the Malays.

inches in height at the shoulder, and is covered with long coarse hair of a dark brown or black colour; the mane along the back of the neck being white, and the hair on the lower jaw being of a straw-colour. On each side of the muzzle there is a naked linear space; the suborbital sinuses are small. (Fig. 106.) This species is closely allied to the Thar of the Nepâl (*Antilope Thar*, Hodgson). In this group the Goral of Nepâl (*Antilope Goral*, Hardwick) is placed by Mr. Hodgson ('Zool. Proceeds.' 1834, p. 85); but it has no suborbital sinuses, nor is the muzzle entirely naked. It will form the type of a distinct subgenus (*Kemas*, Ogilby).

BOVIFORM ANTELOPES.

As the antelopes of the last section approximate to the true goats, so, on the other hand, do the animals of this section approach the oxen. They do not, however, all display an equal degree of proximity: some, indeed, as the Nyl-ghau, are closely allied to groups among the true antelopes, while others have nothing of the antelope in form or appearance. In general they are distinguished by their massive contour, large size, and powerful limbs, conjoined with a heavy head, short neck, and elevated withers. The horns are large, often very thick and solid, and the eyes small: they are in fact bovine in their contour and habits, and gradually link on with the genus Bos. In those which approach the nearest to this genus there are horns in both sexes.

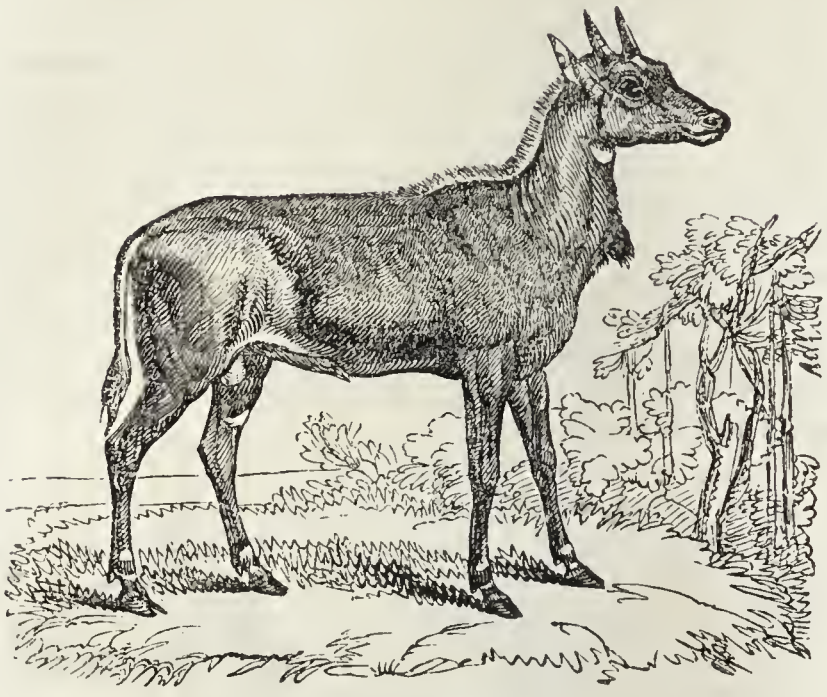
Tragelaphus, Ogilby.—*Horns in the male only. Suborbital sinuses large. Interdigital fossæ distinct. Inguinal pits wanting. Muzzle broad and naked. Teats in the female, four.*

The Nyl-ghau (*Antilope picta*).

This magnificent species, which stands upwards of four feet in height at the shoulder, is a native of the dense forests of India, where it resides alone or in pairs; it is extremely vicious, resolute, and powerful, and will turn

upon its pursuers with great fury. Even in confinement it is not to be approached without caution. Previous to making its attack it drops upon its fore-knees, and in that attitude gradually advances, till within a certain distance of its foe, when it darts suddenly forward with amazing force and velocity. Bold and spirited, however, as it is, it is the most common prey of the tiger. During the day the nyl-ghau lurks in the covert of the forest, whence early in the morning or during the night it wanders forth to feed, invading the adjacent corn-fields and cultivated lands. This species is often bred in captivity both in this country and in India. The female usually produces two at a birth.

107.—Nyl-ghau.



108.—Nyl-ghau.

The male considerably exceeds the female in size. The general colour is slaty blue; in the female, tawny red. The lips, chin, and under parts are white; there is a large white spot on the throat, two smaller ones on the cheeks, and one in the front and two in the rear of each pastern-joint. The young males resemble the females in their colour, which is exchanged for slaty blue on arriving at maturity. A bunch of long pendent hair hangs from the fore part of the neck, and a similar tuft terminates the tail. (Figs. 107 and 108.)

The limbs of the nyl-ghau are well-formed, but when the animal is standing are gathered close under the body, and the tail is drawn in between the hind-legs. Mr. Ogilby regards this animal as the Hippelaphus of Aristotle. It is placed by the author of the article on Antelopes in the 'Penny Cyclopædia' in the same group with the Steenbok, Grysbok, and Klipspringer of Africa; but it has neither their form nor habits.

KOBA.—*Horns only in the male; long, stout, nearly straight, inclined backwards, with a slight inward tendency. Inguinal pores distinct. Suborbital sinuses wanting. Muzzle broad and naked. Teats in female, four.*

THE KOBA, OR SING-SING (*Antilope Koba*, Ogilby).

This species is the "grande vache brune" of the French of Senegal, of which country it is a native. It equals the common stag in stature, and is covered with a coat of long rough hair; a rough bristly mane runs down the back of the neck. The general colour is dark sandy red, passing into gray on the under parts; the face and limbs are dark brown or black; the lips, chin, and a

109.—Koba.

stripe over each eye are white. Of the native habits of the koba little is known; in captivity, judging from the specimens we have seen, it is a gentle and quiet animal. When at rest its attitude resembles that of the nyl-ghau. An allied but smaller species, the Kob, or "petite vache brune" of the French, inhabits Western Africa. The figure (109) of the koba represents the female.

ORYX.—*Horns in both sexes, long, erect, annulated; muzzle nearly naked, or quite; interdigital pits large; neither suborbital sinuses nor inguinal pores; teats of female, four.*

THE ADDAX (*Antilope Addax*, Licht.).

This animal is the Strepsiceros of Pliny, which he states is termed by the Africans Addax or Addas; and, according to Rüppel and Hemprich, and Ehrenberg, who may be said to have re-discovered this species in Dongola, it is denominated Akasch, or Akas, or Addas by the Arabs, with the additional prefix of Abu, "father"—thus, Abu-Addas, a title they bestow on many other animals, as for example the sacred ibis, which they call Abu-Hannes, or Father John. The addax appears to be widely spread in Central Africa, tenanting the deserts in pairs, or perhaps small groups; but of its habits we have no detailed accounts. It stands three feet in height at the shoulder, and is heavily made; the head is large, the neck thick, and the legs robust. The horns are long and round, rather slender in proportion to their length, twisted outwards and describing two turns of a wide spiral, annulated to within five or six inches of the points, which are smooth and sharp; the form of the horns of the female does not differ from that of the male, but in the young they are almost straight. The ears are pretty long and proportionally broader than in most of the smaller antelopes, and the tail reaches almost to the hough and is terminated by a switch of long, coarse, gray hair. The whole head and neck, both above and below, are of a deep reddish brown colour, except a transverse

110.—Addax.

mark of pure white across the lower part of the forehead, between the orbits, which expands on the cheeks and half surrounds the eyes; a patch of black curly hair surrounds the root of the horns, and there is a scanty beard of the same colour on the larynx; all the rest of the animal, including the entire body from the neck backwards, as well as the legs and tail, is grayish white; the hoofs are black, and remarkably broad, to enable the animal to pass more easily over the fine and loose sands of the deserts in which it resides. (Fig. 110.)

The Blauwbok (*Antilope leucophæa*).

This antelope is a native of South Africa, and was formerly common within the boundaries of the Cape

Colony, where it is now never seen. It occurs in the extensive open plains north of the Gariep, living in pairs or small families of five or six. It is a bold and fierce animal, and when wounded will turn upon the hunter with great resolution. At certain seasons it is reported to attack indiscriminately every animal that approaches near it. The blauwbok stands three feet seven inches in height at the shoulder: the horns exceed two feet in length, and are formidable weapons; they are round, uniformly curved backwards, and marked with from twenty to thirty prominent rings; the points, for the extent of six inches, are smooth, and terminate very acute. The term blauwbok, or blue-buck, has been

111.—Blauwbok.

112.—Abu Harb.

given to this animal by the Dutch colonists from its peculiar hue, resulting from the colour of the hide, which is deep black, being reflected through the ashy-gray hair that covers it, giving it a general dark blue tone. (Fig. 111.)

The Abu-Harb (*Antilope leucoryx*).

This species is the Oryx of the ancients, a term now given to an allied South African species, but which of right belongs to the Abu-Harb, which lives in large herds in Sennaar and Kordofan, feeding principally on the leaves of various species of acacia. It is represented in abundance on the monuments of Egypt and Nubia,

and in particular in the inner chamber of the great pyramid at Memphis, where a whole group of these antelopes are represented, some driven forward, others dragged along by the horns, or by a cord around their neck, apparently as trophies brought from a conquered country, or a tribute or present from some subjugated nation.

This animal nearly equals the addax in size. The horns are long and slender, arched gently backwards, annulated at the base, and very sharp at the points. The tail is long, and tufted at the extremity with black and gray hairs mixed together. The hair on the head, body, and extremities is universally short, and lies smoothly along the hide, except upon the ridge of the back, where it is rather longer and reversed, or turned towards the head in a direction contrary to that on the other parts of the body, and forming a short reversed mane from the middle of the back to the occiput. The head is white, with a brown mark descending perpendicularly from each orbit, and expanding over the cheek, and a similar stripe passing down the centre of the face from the horns to the muzzle; the whole neck also, on the throat as well as on the upper part, is of a uniform rusty brown colour, but, with these exceptions, all the rest of the body, as well as the legs and tail, are milk white. (Fig. 112.)

The Oryx (*Antilope Oryx*).

The oryx is a native of South Africa, and differs from the Abu-Harb in having the horns straight: there is a large black mark on the forehead, united with a broad stripe across each cheek. (Fig. 113.)

This powerful antelope is found in the karroo south of the Orange river, and is resolute and dangerous when hard pressed, using its long sharp horns with amazing energy and address, often transfixing several of the hunter's dogs before he can get within shot. The horns measure three feet in length.

113.—Oryx.

The Canna (*Antilope Oreas*);

the Eland or Elk of the Dutch colonists of the Cape; the Impoof of the Caffres.

The canna is a native of Southern Africa, and the largest of all the antelopes, if it can be so termed, measuring full five feet in height at the shoulder, and weighing from seven to nine hundredweight. The horns in the male are large and heavy, measuring a foot and a half in length, nearly straight, sharp at their points, and surrounded almost to the top with a thick prominent spiral wreath. In the female the horns are smaller, and often almost destitute of a wreath. The muzzle is naked; the neck is thick and compressed at the sides, as in the ox, with a large protuberance on the throat, and a deep-hanging dewlap. From the centre of the forehead to the tail runs a short and nearly erect mane, of dark brown hair, which is reversed along the

back of the neck, but directed in the usual way along the dorsal spine. The shoulders are very much elevated, the processes of the vertebræ being greatly elongated at the withers. The tail ends in a black tuft. The general colour is reddish-fawn above ; white on the under parts ; an ashy-gray tint generally prevails on the head and neck. (Fig. 114.)

The flesh of the canna is in high estimation, consequently the animal is much sought after. Unlike antelopes generally, it acquires fat, and indeed often becomes so loaded with it as to be incapable of much exertion. It is asserted that when the animal is hard run, a red oily perspiration has been seen to ooze from the pores of its skin, and that it will sometimes drop down from plethora. The canna is mild and gentle, living in large herds upon

114.—Canna.

the plains and low hills, the old males generally residing apart: so little suspicious are they, that a horseman may ride through the very midst of a herd without causing any alarm, and in this way the sportsman may easily pick out and bring down with his gun the largest and the fattest. The well-conditioned males are generally chosen, and to such an extent have the herds been thinned of these, that some have been seen without a single male among them. The parts of this bovine antelope most esteemed are the large muscles of the thighs, which, when cured and dried, are termed thigh-tongues, from their flavour and fineness of grain.

CALLIOPE, Ogilby.—*Horns only in the male: no lachrymal sinuses nor interdigital pores; inguinal pits distinct; muzzle naked; horns spiral; teats in female, four.*

THE KOODOO (*Antilope Strepsiceros*).

This magnificent antelope is about four feet in height at the shoulder, and is heavily and robustly made, more resembling in external appearance an ox than an antelope. The muzzle is broad and naked; the ears large and slouching; the limbs thick and muscular. The horns of the male are about four feet in length, very thick at the base, and beautifully twisted into a wide sweeping spiral of two turns and a half, surrounded by a prominent wreath, or rather keel, which follows their flexure; they spread boldly outwards, and the animal generally carries them thrown back on the shoulders, partly for the sake of keeping them from striking against branches or becoming entangled in brushwood, and partly on account of their great weight.

The koodoo is a native of South Africa, and is found along the wooded borders of the rivers of Caffraria, living in small families of five or six individuals, and feeding on the shoots and leaves of trees and bushes. Desmarest says it leads a solitary life in mountain districts, but in these respects he is in error; it dwells neither on the hills nor the open plains, but in the wooded tracts following the course of rivers; nor is it solitary.

115.—Koodoo.

When chased, it takes to the water, and swims vigorously; and though heavy, it leaps with wonderful agility. Desmarest says it takes bounds of surprising extent, and it has been seen to clear the bars of a gate of the height of ten feet, though it had but a very limited space for gaining the impetus necessary for the leap. When hard pressed, the males are dangerous from their immense strength and determination, and from their formidable horns, which they wield with great address. The koodoo, however, when taken young, is easily tamed, and becomes quiet and gentle.

The general ground-colour of the koodoo on the back and sides is a light fallow-brown, with a narrow white

ribbon along the spine, and eight or ten similar bands descending from the back and passing obliquely down the sides and hips; the belly and under parts are pale silvery brown. On the neck and withers is a thin spare mane of a brown colour, and the chin, throat, and breast are furnished with similar long hairs, forming a species of beard. The cheeks are marked with two or three round white spots, and a narrow gray line passes from the anterior angle of the eye down towards the muzzle. The tail is moderately long, and equally covered with short hair. (Fig. 115.)

Bubalus, Ogilby.—*Horns in both sexes, heavy, thick, and annulated, first inclined forwards, then suddenly bent backwards, making a bold angle in front; lachrymal sinuses minute; interdigital pits large; inguinal pores wanting; muzzle half naked; teats in the female, two.*

The Bekr-el-Wash, or Wild Ox of the Arabs

(Antilope Bubalus).

This animal is the Bubalus of the ancients; the "animal Africæ proprium, vituli cervive quâdam similitudine" of Pliny. Its representation occurs among the figures on the monuments of Upper Egypt. This animal is spread throughout a great extent of northern Africa, living in numerous herds on the confines of the Tell, or cultivated district, and the Sahara or Great Desert. According to Captain Lyon, it is found on the mountains south of Tripoli. Though Barbary may be regarded as its real habitat, yet it is not altogether limited to that extent of country, for it sometimes crosses the Libyan desert, and gains the banks of the Nile; and was once probably common in Upper Egypt.

The Bubalus, or Bekr-el-Wash, is as large as a heifer, and very bovine in appearance; the head is singularly long and narrow, with a straight flat chaffron; hence the eyes appear as if placed high in the head. The

116.—Wild Ox of the Arabs.

shoulders are elevated, and the neck resembles that of the ox; the general colour is red-brown, a black tuft of long hair terminating the tail. (Fig. 116.)

The bubalus is easily tamed, and, according to Dr. Shaw, of so familiar a disposition, that the young calves frequently mix with domestic cattle, and soon learn to attach themselves to the herd without attempting to escape afterwards. The male bubalus in its mode of combat resembles the bull; he lowers his muzzle to the ground, and striking upwards, or from side to side, endeavours to gore and toss his antagonist with his horns, which are very formidable weapons.

There is in South Africa a species very nearly allied

to the Bekr-el-Wash of Barbary, termed by the Dutch the Hartebeest (*A. Caama*, F. Cuvier). It resides in large herds, and is an object of the chase, its flesh being very finely flavoured, and more nearly resembling the beef of the ox than that of any other animal except the canna. It is moderately fleet, its pace when at full speed resembling a heavy gallop; but when at some distance from its pursuer, it will stop and turn to gaze, as if to ascertain whether he be following or not—a habit which operates to its disadvantage. It is mild and tractable; but when hard pressed, and infuriated by wounds, it uses its powerful horns with great effect, dropping on its fore-knees, and in this position advancing towards its enemy, and then suddenly darting forwards with great force and rapidity. The Hartebeest has rather an extensive range, being found in the Cape Colony as well as almost everywhere between it and the tropic of Capricorn. In the former locality, however, it is now only found on the extensive flats bordering upon the Caffre frontier.

Mr. Pringle has furnished us with the following description of the hartebeest (*Antilope bubalis*) which also came under his observation:—

"The hartebeest is one of the largest and handsomest of the antelope family. It is nearly of the same height as the gnu, but of a more slender and elegant shape. It was pretty numerous on the mountains around our settlement, and not unfrequently furnished us with game. It had many other enemies, I observed, and some of them only less formidable than man, the great destroyer. In the nooks of the narrow ravines, through which the wild game are wont to descend from the steep and stony mountains, for change of pasturage, or to drink at the fountains that ooze from their declivities, I have frequently found fresh skulls and horns of the hartebeest—those slight relics being all that remained to indicate that there the lion had surprised and rent his prey, and that the voracious hyæna had followed and feasted on the fragments, devouring even the bones, except the skull and a few other unmanageable portions. Though the common hyæna is no match in speed for the fleet

full-grown hartebeest, he probably picks up many of the young ones, and is always sure at least of the aged or infirm. The hyæna dog is probably more destructive. Too slender to attack such an animal as the hartebeest individually, these 'dogs of the desert' associate themselves in packs, to hunt down this and the other large antelopes. I once witnessed a chase of this kind, in which a noble hartebeest, hard pressed by a troop of these 'wildehonden' (as the boors call them), dashed across our garden and orchard ground and onwards among our huts, at noon-day. The wild dogs, on hearing the halloo that was raised by some of the people who witnessed this scene, stayed their quest for a brief space, as if alarmed; but, before we could get a gun or two to attack them, they vigorously renewed the chase down the valley, making a small circuit to avoid the houses; and, as the poor antelope seemed sore spent, I have no doubt that he would be speedily run down, notwithstanding the slight advantage he gained by our interference."

Another allied species is the Sassaby, or Bastard Hartebeest (*A. lunata*). Though this species (as it is stated in the catalogue of the South African Museum) is not known to occur so far south as the Colony, yet it is tolerably abundant in the neighbourhood of Lattakoo, and very much more so between 26° S. lat. and the tropic of Capricorn. In the latter locality especially it is found, like the hartebeest, in herds of from six to ten or even more individuals, and chiefly frequents flat and wooded districts. Where fire-arms are used, or where the necessities of natives have made them indefatigable in the chase, this animal is vigilant and shy; but in situations where it has been left in comparative peace, it regards the approach of man with curiosity, almost unmixed with fear; just discontinuing to feed, and raising its head to gaze, but never attempting to fly unless he approach very close. Its flesh is fully as valuable as that of the hartebeest.

Catoblepas, H. Smith.—*Horns in both sexes, commencing in a dense mass covering the top of the forehead,*

whence they sweep downwards over the eyes, and then turn boldly upwards, terminating in sharp round points. Head heavy and ox-like; muzzle very broad and muscular; and the nostrils covered by a large moveable lid, continued from the skin of the muzzle, and capable of being opened or shut at pleasure. Suborbital sinus reduced to a small gland in the skin, concealed in a tuft of hair. No inguinal pores. Females with two teats. A full mane runs down the neck. Tail furnished with long hairs, and bushy.

The animals belonging to this generic group are remarkable for the singularity of their form, which partakes of that of the horse and buffalo. The head and horns are those of a buffalo; the eyes are large, wild, and expressive of a savage and vindictive disposition. The neck, with its mane, the tail, and the general contour of the body are those of the horse; the legs are well turned and vigorous, resembling those of the stag. The action and gallop of these animals (the Gnus) are so much like those of a horse, that a troop of them seen scouring the plain at a distance might easily be mistaken for zebras or quaggas, were it not for the difference of colour. Besides the mane down the back of the neck, the chaffron above the muzzle is furnished with a tuft of long, diverging, bristly hairs, and the chin and throat are also covered with hairs of a similar character, forming a shaggy beard, while a full mane flows down from the chest between the fore-limbs.

The Gnu (*Antilope Gnu*),

T'Gnu of the Hottentots. The gnu equals a well-grown ass in size, exceeding four feet in height, and is a native of the wild karroos of South Africa and the hilly districts, where it roams mostly in large herds, which migrate according to the season. The extent of its range in the interior regions is not known; as far, however, as travellers have penetrated, herds have been met and chased, for its flesh is prized as food both by

the natives and the colonists. They are, however, extremely wild, and not to be approached without difficulty. On the first alarm, away scours the troop, not in a tumultuous mass, but in single file following a leader. Their speed, as might be expected from the vigour and compactness of the body and limbs, is very great. Sometimes, however, when any object of apprehension appears, they do not exert it, but plunge about, flinging out their heels, butting, and tossing up their heads, and exhibiting emotions of violent fury. (Fig. 117.) It is seldom, however, that they venture upon an attack, unless hard pressed or wounded, when they defend themselves with desperation; dropping on their knees, they dart forward upon their assailant with extraordinary force and im-

117.—Gnu.

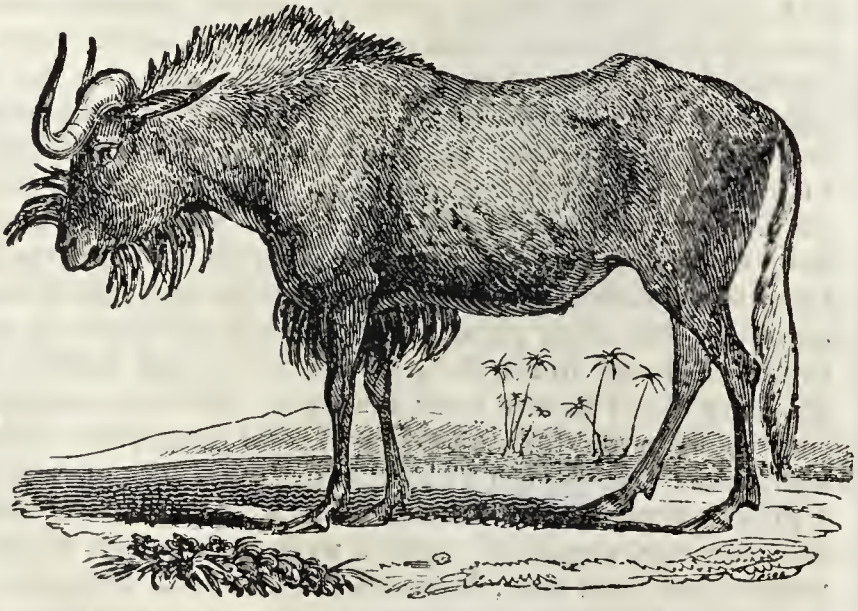
petuosity, and unless he be cool and prepared he cannot escape his fate.

We are indebted to Mr. Pringle for the following account of this animal, as seen by him in its native regions :—

"The curious animal called *gnu* by the Hottentots, and *wilde beest* (*i. e.* wild ox) by the Dutch colonists, was an inhabitant of the mountains adjoining the Scottish settlement at Bavian's river, and I had therefore opportunities of very frequently seeing it both singly and in small herds. Though usually, and perhaps correctly, by naturalists ranked among the antelope race, it appears to form evidently one of those intermediate links which connect, as it were, the various tribes of animals in a harmonious system in the beautiful arrangement of nature. As the *hyæna dog*, or '*wilde hond*,' of South Africa connects the dog and wolf tribe with that of the hyæna, in like manner does the gnu form a graceful link between the buffalo and the antelope. Possessing the distinct features which, according to naturalists, are peculiar to the latter tribe, the gnu exhibits at the same time in his general aspect, figure, motions, and even the texture and taste of his flesh, qualities which partake very strongly of the bovine character. Among other peculiarities I observed, that, like the buffalo or the ox, he is strangely affected by the sight of scarlet; and it was one of our amusements, when approaching these animals, to hoist a red handkerchief on a pole, and to observe them caper about, lashing their flanks with their long tails and tearing up the ground with their hoofs, as if they were violently excited, and ready to rush down upon us; and then all at once, when we were about to fire upon them, to see them bound away, and again go prancing round us at a safer distance. When wounded, they are reported to be sometimes rather dangerous to the huntsman; but though we shot several at different times, I never witnessed any instance of this. On one occasion a young one, apparently only a week or two old, whose mother had been shot, followed the huntsman home, and I attempted to rear it on cow's milk. In a few days it

appeared quite as tame as a common calf, and seemed to be thriving; but afterwards, from some unknown cause, it sickened and died. I heard, however, of more than one instance in that part of the colony, where the gnu, thus caught young, had been reared with the domestic cattle, and had become so tame as to go regularly out to pasture with the herds, without exhibiting any inclination to resume its natural freedom; but in consequence of a tendency which the farmers say they evinced to catch, and to communicate to the cattle, a dangerous infection, the practice of rearing them as curiosities has been abandoned. I know not if this imputation be correct, but it is true that infectious disorders do occasionally prevail to a most destructive extent among the wild as well as the domesticated animals in South Africa, and especially among the tribes of larger antelopes.

"There is another species of gnu found farther to the northward, of which I saw a single specimen in the colony, which in the shape of the horns, and some other particulars, still more resembles the ox. This species has been described by Burchell under the name of *Antilope taurina*."



118—Gnu.

The general colour of the gnu is deep umber-brown verging upon black; the tail and mane are gray; the latter indeed is nearly white. (Fig. 118.) Fig. 119 represents a front view of the head of the animal, which may be compared with the characters we have detailed. Besides the common gnu, two other species of this genus are known. The first is the Kokoon, as the Booshwanas term it (*A. taurina*, Burchell). It is larger than the preceding species, with which, though inhabiting the same districts, it never associates; it is far less daring than the gnu, and is sometimes found solitary, but most frequently in herds, which wander over the vast plains of the interior.

119.—Head of Gnu.

The next species is the brindled gnu (*A. Gorgon*, H. Smith): little is known respecting it, and it appears to be comparatively rare, and is perhaps restricted to certain territories beyond which it does not wander.

A specimen exists in the Museum of the London Missionary Society, which was brought from South Africa. It is certainly very distinct from either of the preceding animals.

So far then have we endeavoured to give a sketch of the Antelopes, a family which, as it usually stands in systematic works, consists of a number of distinct forms or genera, ill-assorted under one head, and exhibiting

very different degrees of relationship to each other. When we compare the Canna on the one side, and the Pronghorn on the other, with the Gazelle of the desert, we see few points of affinity, and are forced to the conviction that the division-line between the family "Antelope" of most writers, and that of the ox and the goat, is purely arbitrary. Our object has been, without departing from our plan of clothing science in a popular dress, to convey some idea of the principal groups into which the Antelopes are resolvable, and to delineate succinctly the habits and manners pervading each group, or displayed by the more remarkable species. Though we have given generic titles and definitions, yet we have used the term "Antilope" throughout, in the specific name of each animal, as being more familiar to general readers than such words as Catoblepas, the title of the genus comprehending the gnu; Calliope, that of the koodoo, &c.; deeming it sufficient to have stated them, and noted their characters at the head of each genus. Those who wish to investigate this subject at length, may consult Col. Hamilton Smith's 'Treatise on the Ruminants,' in Griffith's translation of the 'Règne Animal' of Cuvier; and a paper by Mr. Ogilby, in the 'Zool. Proceeds.' for 1836, p. 132, et seq.

GOATS AND SHEEP.

Though the domestic races of goats and sheep, as we are accustomed to see them in Europe, exhibit marked distinctive features, yet the diagnostics fail us in a great measure when we turn to the breeds of sheep in other countries, which exhibit a greater length of limb, a more goat-like form of body, and a clothing of hair; and it is from paying attention to domestic breeds, rather than to truly wild species, that naturalists have been inclined to consider both goats and sheep as generically the same, seeing that it is for the most part in countries where the domestic sheep is woolly that its difference from the goat is at once palpable. "So little," says Cuvier, "do the sheep deserve to be generically separated from the

goats, that they even produce together a mixed fertile race," an assertion we query. Again, in the 'Zool. Proceeds.' 1834, Mr. Hodgson, after a long table of differences between sheep and goats, adds, "After all, there are no physical distinctions at all equivalent to the moral ones (those deduced from temper and disposition of the two species) so finely and truly delineated by Buffon, and which, notwithstanding all that Col. Hamilton Smith urges in favour of the courage and activity of the sheep, will even be recognised as the only essential diagnostics of the two genera." If there are, indeed, no other distinctions, the "moral ones" are nothing, for the wild species of goat and sheep are not so contrasted in disposition; and even if they were, it is not from such points that the naturalist has to deduce generic characters.

In the goats, and also in the sheep, there are horns in both sexes; there are also glandular interdigital pits in the sheep and goat, and they are alike formed for rocky or mountain abodes; the muzzle is small and hairy. The females have two teats. The goats have the horns compressed laterally, rugose on their anterior aspect, and arching upwards and backwards; there is no suborbital sinus. The sheep have the horns voluminous, turned to the sides, curling downwards, and often making a double flexure. There are deep suborbital sinuses, with a linear orifice incapable of being expanded, and, unless sought for, not to be seen amidst the wool or dense hair. Besides these characters, the chaffron is generally more arched in the sheep than the goat; and the latter has mostly the lower jaw furnished with a beard. Neither have inguinal pores.

Genus Capra—The Goats.

The Common Goat (*Capra Hircus*, Linn.).

Αἴξ (ὁ καὶ ἡ, but generally used for the female), τράγος, χίμαρος (the male), ἔριφος (young male kid of three or four months), χίμαιρα (young female before its first winter), of the Greeks; Caper and Hircus (male), Capra

(female), Hœdus, or Hædus (a young male kid), Hœdulus, or Hœdillus (a very young male kid, or kidling, (ἔριφος), Capella (female kid), of the ancient Italians; Becco (male), Capra (female), Capretto, and Capretino (kid and kidling), of the modern Italians; Bouc (male), Chèvre (female), Chevreau (kid), of the French; Cabron (male), Cabra (female), Cabrito (kid), of the Spanish; Cabram (male), Cabra (female), Cabrito (kid), of the Portuguese; Bock (male), Geisz (female), Bocklein (kid), of the Germans; Bok (male), Geit (female), of the Dutch; Bock (male), Geet (female), Küdh (kid), of the Swedes; Buk, Geedebuk (male), Geed (female), Kid (kid), of the Danes; Bwch (male), Gafr (female), Mynn (kid), of the antient Britons. (Fig. 120.)

120.—Common Goat.

As is the case with almost every domesticated quadruped, great uncertainty hangs over the origin of the goat. Some naturalists refer it to the Ibex of the European mountain-ranges, others regard it as descended from the Paseng of Persia (*Capra Ægagrus*) or from

the Caucasian Ibex (*Capra Caucasica*, Güldenst.). Cuvier says that the Ibex of the European Alps, as well as that of the Caucasus, breeds freely with the common goat, producing a fertile progeny; and there were in the Garden of Plants at Paris goats of very large stature, taken wild on the Alps and Pyrenees, the produce, as asserted, of the Ibex with the common goat. After all, however, nothing positive can be ascertained on the point in question; it is one of those which must be left in abeyance. The subjugation of the goat, whatever may be its primitive stock, took place at a very early epoch, and it is evident that the flesh of the kid was accounted a delicacy. There was formerly in Syria, as there is at the present day, a breed of goats with long pendent ears, and fine long hair fit for the manufacture of some kinds of stuffs. In this respect they perhaps resembled the Angora goat (Angora is in Anatolia, Asiatic Turkey). We read that the Israelites made curtains of goats' hair as a covering for the Tabernacle, and the modern Arabs manufacture the cloth of their tents from the hair of the long-eared breed, which is generally of a black colour, and which they prefer to the hair of the camel. The females of this breed yield excellent milk in profuse quantity, and are therefore much esteemed. Burckhardt notices a very fine breed of goats of this race in the valley of Baalbec, which he says are not common in other parts of Syria; they have very long ears, large horns, and long hair, but not silky like that of the goats of Anatolia. The hair of the goats of Italy in the time of Virgil was long, but of coarse quality. In the 'Georgics' (lib. iii.) the shepherds are directed to shear the beards and long hair of the Cinyphian goats for the service of the camp, and for garments for the mariner. Varro also observes that goats were shorn for the use of sailors, for coverings to engines of war, and to workmen's instruments. From the earliest antiquity the milk of the goat has been in requisition, and in the present day the goat and sheep in Syria take the place of the cow, if not exclusively, to a great extent.

From the beginning of April to the beginning of

121.—Long-eared Syrian Goat.

September, the towns are supplied with milk by large herds of goats, which pass through the streets every morning, and are milked before the houses of the customers. The products of the milk are furnished in abundance at the same season. In Switzerland, flocks of goats are kept for the sake of their milk, and our classical reader will remember the lines in Virgil ('Georgics,' lib. iii.) which are still applicable, "Pascuntur vero sylvas," &c. Besides the long-eared and long-haired race of Syria, of which Fig. 121 is a representation, there is also a breed closely resembling that common in Europe: among other races we may here notice the Dwarf African, with close hair, almost beardless, and with a little pendulous tassel-like excrescence of skin hanging from each side of the throat: of this breed we have seen specimens in England.

The most celebrated variety of the domestic race is the goat of Cashmir (Fig. 122), which produces a wool of exquisite fineness, from which are manufactured the costly Cashmir shawls, not to be purchased even in the country where they are wrought but at a great price. This goat is spread through Thibet, and in the country of the Kirghiz, at the bend of the Ural north of the Caspian Sea; it is covered with silky hair, long, fine, flat and falling, and with an under-vest, in winter, of delicate grayish wool; and it is this wool which constitutes the fabric of the shawls. The average weight of wool produced by a single goat is about three ounces, and it sells in Thibet for about five shillings a pound: ten goats are required to furnish sufficient wool for a shawl a yard and a half square. It appears that in Thibet the wool is first combed from the goats in the mountains and sent to Cashmir, where it pays a duty on entry. It is there bleached with rice-flour, spun into thread, and taken to the bazaar, where another tax is paid upon it; the thread is then dyed, and the shawl is woven and the border sewed on; but the weaver has now to carry it to the custom-house, where a collector puts on it any tax he pleases, and in this he is only limited by the fear of ruining the weaver, and consequently losing future profit.

122.—Cashmir Goat.

All the shawls intended for Europe are packed up and sent to Peshawur across the Indus; this part of the journey is generally performed upon men's backs, for the road is in many parts impassable, even by mules, being across deep precipices, which must be traversed by swinging bridges of ropes, and perpendicular rocks, which are climbed by wooden ladders. At each station of this toilsome journey, which lasts twenty days, a tax is paid, amounting to about two pounds sterling for the whole journey. From this point till they come near the confines of Europe, in addition to the many custom-houses at which they must pay tribute, these valued articles of merchandise are exposed to the marauders of Afghanistan and Persia, and to the Turkomanic hordes, whose forbearance must be purchased at a high price. After leaving Persia, many shawls get to Europe over the Caucasus, and through Russia, but the largest number reach Constantinople through the Turkish provinces.

In April, 1819, M. Jaubert, under the French government, succeeded in bringing a flock of Thibet goats, with great loss and difficulty, from the Kirghiz territory to France. Monsieur Jaubert left Paris in April, 1818, and proceeded towards Asia, through Southern Russia, by Odessa, Taganrog, and Astrakhan. On his way he received much information from merchants of Bukharia and Armenia, and ascertained that a handsome race of goats with brilliant white fleeces was to be found among the Kirghiz tribes, who wander in the plains partly surrounded by the great bend of the river Ural or Yaik, which divides Europe from Asia. Samples of the down from these animals were shown him, and he found locks of it scattered here and there in parts of the steppes between Astrakhan and Orenburg, which convinced him that he was in the track of the genuine shawl-goat; this was further corroborated by the designation of *Tibet*, by which name the animal was known to the native tribes. He soon found large flocks of the goats in possession of the Kirghiz, and of them he purchased nearly thirteen hundred, with which he prepared to retrace his steps. The home journey across the plains of Russia appears to have been injudiciously timed; it was begun at the setting-in of winter; the goats crossed the Volga at Tsaritsin, nearly 300 miles above Astrakhan, and proceeded to Taganrog, where it was intended to embark them; but, as might have been expected, the sea was frozen, and it was found necesary to drive them on to Caffa, which they reached on the 24th of December, nearly 300 of their number having died by the way of cold and fatigue.

At Caffa the flock was divided into two portions: one of these, consisting of 566 goats, was put on board a Russian vessel, which arrived at Marseilles about the middle of April, 1819; the remainder embarked on board another vessel with Monsieur Jaubert himself, and reached Toulon towards the end of April. No further account has reached us of this latter portion of the flock, but ample details concerning the division which landed at Marseilles have been given by monsieur Tessier, who

was commissioned to receive the animals as soon as they should leave the lazaretto, where they were shut up on landing, according to the quarantine regulations. M. Tessier found the poor creatures in a wretched state; they had been packed together in the hold of the vessel, where no fresh air ever reached them; and the space they had to move in was less than the length of their bodies. This treatment had produced disease in almost all the flock; the hair was dropping from them, and it was found necessary to shear off what remained. They also suffered from convulsions; but the most fatal malady with which they were attacked was a tubercular consumption, from which great numbers perished. A close lazaretto was not calculated to remove the complaint, and many deaths took place daily during the thirty days they were confined. "We have saved but very few," says M. Tessier, "and only such as had slight attacks; the remedy employed was flour of brimstone mixed with their food."

The animals that escaped these multiplied ills were soon removed to more congenial situations; some were placed in the royal bergerie near Perpignan, at the foot of the Pyrenees, some in the hilly country about Toulon, and others farther to the west in the departments near the Rhone. The whole number surviving of both flocks when Monsieur Tessier wrote his account (August) was about 400; they were then generally in good health, their hair had grown to a considerable length, and the valuable down had begun to show itself.

The shawl-goat was thus naturalized; and subsequent experience has shown that the down produced in Europe is not inferior to that of the original Thibet stock. Fears were at first entertained that this could not be the case; it was said that the breed obtained was not pure, that it had degenerated; and a letter from Moorcroft, written in the beginning of 1822, at Ladakh in Thibet, seemed to confirm the suspicion. He says, "France has, I learn, procured a flock from some of the steppes near the Caspian, which must be inferior to those of Thibet, as lately Aga Aabdi was employed by Russia itself to procure the

breed from the borders of Chinese Turkestan. But these fears were unfounded. The small produce of wool, however, obtained from each animal not averaging more than three ounces, precluded all hope of making a profit by rearing these animals, and the scheme would have failed had it not occurred to M. Polonceau that a cross between the Thibet and Angora goat, remarkable for the length and silkiness of its hair, might be an improvement on both. The experiment was tried, and succeeded; and instead of three ounces, several of the mixed race produced thirty ounces of down in one season, and of a superior quality, being of finer and longer staple, while the animals themselves were more hardy and docile.

In 1824 some of the pure Thibet goats were imported from France into England by Mr. Towers, and located at Weald Hall, Essex; but their limited produce militated against the extension of the breed with advantage. In 1831 Mr. Riley, an enterprising proprietor of New South Wales, purchased from M. Polonceau ten females and three males, which he conveyed safely to London, and thence to New South Wales; but with what ultimate results we are not able to state.

To describe the common goat is superfluous; its habits, its boldness, and its activity are well known. It climbs rocks and rugged mountains with great agility, and will stand secure wherever it can manage to get the most limited footing. In Egypt and Syria goats are often taught various feats of dexterity, for the performance of which their natural address and activity peculiarly qualify them, but to execute which, nevertheless, requires considerable practice. Dr. Clarke, in his 'Travels' (vol. ii.), notices an instance of this kind, which he describes as follows:—"Upon our road we met an Arab with a goat, which he led about the country for exhibition, in order to gain a livelihood for itself and owner. He had taught this animal, while he accompanied its movements with a song, to mount upon little cylindrical blocks of wood, placed successively one above the other, and in shape resembling the dice-boxes belonging to a backgammon table. In this manner the goat stood, first

123.—Arab and Goat.

upon the top of one cylinder, then upon the top of two, and afterwards of three, four, five, and six, until it remained balanced upon the top of them all, elevated several feet from the ground, and with its four feet collected upon a single point, without throwing down the disjointed fabric upon which it stood. The practice is very ancient. It is also noticed by Sandys. Nothing can show more strikingly the tenacious footing possessed by this quadruped upon the jutty points and crags of rocks; and the circumstance of its ability to remain thus poised may render its appearance less surprising, as it is sometimes seen in the Alps, and in all mountainous countries, with hardly any place for its feet, upon the sides and by the brink of most tremendous precipices. The diameter of the upper cylinder, on which its feet ultimately remained until the Arab had ended his ditty, was only two inches, and the length of each cylinder was six inches." Fig. 123 represents this performance.

The period of gestation with the goat is five months, and the female usually produces two, sometimes three young at a birth.

The use of the goat in England, compared with other countries, is very limited; the demand for its milk is only occasional, and the flesh even of the kid is not in much request. Few stable-yards, however, are without a goat or two, the peculiar odour of the animal (especially strong in the male) being supposed to be both salutary and grateful to horses. While doubting this, we can well imagine that the presence of the active, familiar, and playful goat may not be unproductive of benefit to the horse confined in his stall, as the latter, like most animals, delights in society, and instances of attachment between goats and horses are far from being uncommon.

From the domestic goat we must pass to consider some of its wild representatives.

The Ibex, Bouquetin, or Steinbok (*Capra Ibex*).

This bold and powerful animal, armed with huge sweeping horns, inhabits the alpine heights of Europe and Western Asia. It associates in small troops, consisting of a male and a few females. The horns of the male curve boldly over the back, their anterior surface presenting a series of regular protuberances or partial rings: their length is often three feet. In the female they are smaller. The hair of the Ibex in summer is short and close, in winter long and thick: its colour is yellowish gray, a black streak extending along the spine; the croup is white, as are also the under parts of the body, a dark tint abruptly dividing the white from the general colour above. The chin is bearded. The Ibex stands two feet six or eight inches in height, and is extremely active and vigorous. (Fig. 124.) The chase of the Ibex is as arduous as that of the chamois, the animal leading its pursuer, unless he can steal upon it unawares with his rifle, a dangerous track over steep and rugged mountain pinnacles, along the brink of precipices, and over fearful chasms: when at last hard pressed, the

124.—Ibex.

Ibex will often turn upon its foe with impetuous rapidity, and hurl him headlong down the steep rocks or abrupt precipice.

The Ibex is vigilant and wary; and it is only during the night that it descends to pasture in the woods, but at sunrise again repairs to the bleak mountain summits. Like the chamois, it is satisfied with frugal fare and a scanty supply of water. It is said that the old males seek more elevated spots than the females and younger males, which are more easily to be obtained. The only sound which the animal makes is a short whistle, and when irritated, a snorting noise. In Europe its favourite

haunts are the Alps, the Apennines, the Pyrenees, and the mountains of Tyrol. In Asia it is found in the mountain-chain of the Taurus.

The Paseng (*Capra Ægagrus*).

The Paseng is found in the mountains which traverse the north of Persia and India as far as China, and especially the Caucasian chain and that of Taurus. It is

125.—Paseng.

known to the Turkomans, Kirghiz, and other nomadic people to the north of Persia, and also to the natives of the Persian provinces at the southern base of the mountains. The Paseng exceeds the largest domestic goat in size, and is very strong and active, precisely resembling the Ibex in habits and manners. The general colour is gray, shaded with rusty brown: the forehead is blackish brown, whence a line of the same colour extends down the spine, crossed by a similar band over the withers; the beard is long and of a dark brown, which is the colour of the limbs; a white patch occupies the crupper. The horns of the male are very large, compressed, and slightly diverging as they arch backwards; their anterior edge is narrow, and marked by a series of protuberances with deep notches between. (Fig. 125.)

A species of Ibex, distinct, it is believed, from the European, inhabits the Caucasian range, and especially the neighbourhood of the sources of the rivers Terek and Caban. It is the *Capra Caucasica* of Güldenstern. (Fig. 126.)

Rüppel, in his 'Zoological Atlas,' describes and figures an Ibex from the mountains of Abyssinia, under the native name of Walie (*Capra Walie*, Rüpp.). It is of a dark yellowish umber, the under surface and inside of the limbs being white.

Another distinct species is the Jemlah Ibex, described by Col. H. Smith (*Capra Jemlaica*), with horns peculiarly massive at the base. It is an inhabitant of the range of the Himalaya mountains. This species would appear to be the Jhâral of Mr. Hodgson. Its height is thirty-three inches; the head is finely formed, full of beauty and expression, clad in close short hair, and without the least vestige of a beard. The Jhâral is of compact and powerful make, with a spare, short, and bowed neck; deep barrel and chest; longish, very strong and rigid limbs, supported on perpendicular pasterns and high compact hoofs. The fur is of two sorts, an outer coat of straight and somewhat harsh hair, and an inner vest of soft fine wool. The fore-quarters are superb, and wholly invested in a long, flowing, straight, lion-like

126.—Ibex (*Capra Caucasica*).

mane, feathered vertically from the top of the withers and sweeping down below the knees. The horns are nine inches long, subtriangular, wrinkled across, and gently recurved. The colour is deep brown superficially, but under the outer coat hoary blue, which is the prevailing tint of the mane; chin and lips hoary, with a blackish mark below the angle of the mouth. This fine species is found in the Kâchar region of Nepâl, solitary or in small herds: it is bold, capricious, active, and pugnacious, but easily tamed, and breeds, as does the ibex, with the common goat. (See 'Proceeds. Zool. Soc.' 1834, p. 106.) Mr. Hodgson considers it distinct from the *C. Jemlaica*, and terms it *C. Jhâral.*

An ibex from Nubia and Arabia is described by Fred. Cuvier, under the title of *Capra Nubiana.* It is more slightly built than the common ibex, with slender elongated horns two and a half feet in length. A specimen

is preserved in the museum of the Zoological Society, London. How far the species of ibex we have noticed are truly distinct from each other, or mere varieties resulting from climate and other causes, we will not attempt to decide. It is perhaps the Caucasian ibex that exists in Palestine, Edom, and Sinai, and which is stated closely to resemble the ibex or bouquetin of the Alps. It is called in Arabic Beden and Táytal. The former appellation is exclusively applied to the male, which is readily distinguished by a beard and large knotted horns curving backwards over the body. The horns of the female are very much smaller, scarcely exceeding in size those of the gazelle.

The Aoudad

(*Capra Tragelaphus; Ovis Tragelaphus*, Pallas; *Ammotragus Tragelaphus*, Blyth, in 'Zool. Proceeds.' 1840, p. 78).

This species is in some respects intermediate between the goat and sheep, with which latter it is associated in most systematic works. It differs from the sheep in having a concave chaffron, and in the absence of suborbital sinuses, but in the form of its horns it resembles them more than it does the ibex or wild goat. These horns are stout, subquadrangular, and ringed; they diverge more laterally than those of goats in general, and curl as in the sheep. There is no beard, but a pendent mane of long coarse hairs begins under the lower jaw, and runs along the under side of the neck and chest. The fore-legs above the knee are also covered with long hair, which hangs round the leg below the knee like a ruffle, whence the French term this species "mouflon à manchettes." The rest of the body is clothed with short hair; the general colour is dull yellowish brown. The male attains a large size, exceeding a fallow-deer, and measuring more than three feet at the shoulder. The horns are sometimes two feet in length following the curve. The female is a third smaller than the male. (Fig. 127.)

127.—Aoudad, or Kebsch.

The Aoudad, as it is called by the Moors of Barbary, is found in Sinai, and in the mountains which border the Nile to Ethiopia and Abyssinia. In Egypt it is termed Kebsch by the modern Arabians. It is also spread throughout the whole of North Africa, above 18°, frequenting in small families the steepest and most inaccessible crags. It is abundant in the range of the Atlas, tenanting the woods at a high elevation, and the precipitous rugged heights usually clothed with forests at their base. The Aoudad is wonderfully agile, and leaps with amazing precision to great distances, from ledge to ledge,

and from point to point, over the most elevated ridges. The old ones are not unfrequently shot by the Moors of Tunis, Tripoli, and other places, and the young are occasionally captured alive. It is, however, very rarely seen in European menageries. A female some years existed in the gardens of the Zoological Society, London, and is the only one we have ever had the opportunity of examining alive. Fine preserved specimens are both in the British Museum and that of the Zoological Society, London. This species is clearly delineated on the monuments of ancient Egypt.

GENUS OVIS.—SHEEP.

Of all our domestic animals, the sheep is that of which we have the earliest notice: "Abel was a keeper of sheep." It was reclaimed in the primordial era of man's existence on the globe, and we must look to Western Asia as its original habitat. From this centre it has more or less gradually spread by the agency of man, and, influenced by climate, food, and treatment, has ramified into numerous varieties. Naturalists have amused themselves with conjectures as to the wild stock whence the domestic sheep has descended; some asserting the Mouflon of Crete, Corsica, and the islands of the Grecian Archipelago to be its origin; others the Argali of Siberia: others, again, that the European sheep are the descendants of the Mouflon, the Asiatic of the Argali. Mr. Blyth considers it likely "that more than one wild species have commingled to form the numerous domestic races," though, as he adds, certainly none as yet described; and though so many decidedly distinct wild species have been added to the genus, we are far from having ascertained the complete number existing, several more yet remaining to be discovered, upon the lofty table-lands and snowy mountains of Middle Asia, from the Caucasus and Taurus to the Altai; and among them it is probable there may be some much more nearly allied to the domestic races than any at present known. He believes that a wild sheep or Argali in central Persia

noticed by Sir John MacNeill, will prove upon further investigation to be the wild stock, or one at least of the wild stocks of the domestic sheep. This wild Persian species is at present undescribed. When we consider that for several thousand years the domestic sheep has been subject to man, and undergone many modifications, we cannot help doubting as to the recognition of its primitive type; nay, we even doubt whether that type be extant. Hector Boethius describes a wild breed of sheep in the island of St. Kilda exceeding the largest goat in size, with heavy massive horns, longer than those of the ox, and as bulky, and with a tail hanging to the ground. Skulls of sheep, perhaps belonging to this race, occur in peat-bogs; two of these crania, one probably that of a male, the other of a female, which were

128.—Head of Armenian Argali.

obtained in Ireland from the peat, were some time since exhibited to the Geological Society. Pennant remarks that such an animal as Boethius has described is figured on a bas-relief taken out of the wall of Antoninus near Glasgow. These animals, whether they ever existed or not, were distinct not only from the Mouflon of Corsica,

129.—Mouflon of Corsica.

but from any other of the wild species as far as we know them.

In the 'Zool. Proceeds.' 1840, is a paper by Mr. Blyth, entitled 'An amended list of the genus Ovis,' which is too full of information to be altogether passed over. We may premise by observing that Fig. 128 is a sketch of the head of the Armenian Argali (*Ovis Gmelinii*, Blyth); Figs. 129 and 130 are drawings of the Mouflon of Corsica (*Ovis Musimon*).

The species (granting that they are all distinct from

each other) enumerated by Mr. Blyth are the following, some of which are new to science :—

The Pamir sheep, or Rass (*Ovis Polii*, Blyth). "In the narrative of the celebrated Venetian traveller Marco Polo, we read that upon the elevated plain of Pamir, eastward of Bokhara, and 16,000 feet above the sea-level, wild animals are met with in great numbers, particularly sheep of a large size, having horns three, four, and even six palms in length. The shepherds form ladles and vessels from them for holding their victuals. They also construct fences for enclosing their cattle and securing them against the wolves, and which likewise destroy many of the wild sheep. More recently an animal called the Rasse was indicated, from report, in Sir A. Burnes's 'Travels in Bokhara,' and its horns have been since transmitted to the Royal Asiatic Society, by Lieut. Wood, of Sir A. Burnes's party, through the medium of

130.—Mouflon of Corsica.

G. 1. Vigne, Esq." This pair of horns was labelled Rass or Roosh. Sir A. Burnes writes: "I have heard of an animal called Ross by the Kirghises, and Kooshgar by the natives of the low countries; but Lieut. Wood, in the narrative of his recent journey to the source of the Oxus, distinguishes between the Rass and the Kutchgar, the former having straight spiral horns, and its dun-colour being of a reddish tinge. Both are said to be peculiar to the Pamir. The same writer, speaking of the Kutchgar, says it was a noble animal, standing as high as a two-year old colt, with a venerable beard, and two splendid curling horns, which, with the head, were so heavy as to require considerable exertion to lift them. Though poor in condition, the carcass divested of its offal was a load for a baggage pony. The Kutchgar is gregarious, congregating in herds of several hundreds; they are of a dun-colour." This traveller confirms Marco Polo's narrative: "We saw," he writes, "numbers of the horns strewed about in every direction, the spoils of the Kirghise hunter." "The ends of the horns, projecting over the snow, often indicated the direction of the road, and wherever they were heaped in large quantities, there our escort recognised the site of a Kirghise encampment." The flesh is much prized by these people, who shoot it (the animal) with arrows. "The Rass is said to delight in the coldest districts; a common-sized individual will require two horses to bear its flesh from the field." The horns, following their curvature, are nearly five feet in length. It would appear that the Kutchgar has yet to be added to the list of species.

The Siberian Argali (*Ovis Ammon*).—This noble sheep is described by Pallas.

The Kamtchatkan Argali (*Ovis nivicola*).—M. Eschscholtz, who describes this species, states it to be very numerous on the mountains of Kamtchatka; in summer it resides upon the snow-clad heights, but in winter it descends to the lower regions. Kotzebue notices its agility.

America presents us with two species very closely allied to the Siberian Argali—the Rocky-Mountain Ar-

gali (*Ovis montana*), and the Californian Argali (*O. Californiana*, Douglas). The Rocky Mountain sheep inhabit the Rocky Mountain range of North America, and, as most suppose, were first discovered by the Fathers Piccolo and de Salvatierra, when, in 1697, they established the first mission in California, nearly two centuries after the first discovery of that country.

"We found," observes Father Piccolo, "two sorts of *deer*, that we know nothing of; we call them sheep, because they somewhat resemble ours in make. The first sort is as large as a calf of one or two years old; its head is much like that of a stag, and its horns, which are very large, are like those of a ram; its tail and hair are speckled, and shorter than a stag's; but its hoof is large and round and cleft, as an ox's. I have eaten of these beasts; their flesh is very tender and delicious. The other sort of sheep, some of which are white, and others black, differ less from ours. They are large, and have a great deal more wool, which is very good, and easy to be spun and wrought." Dr. Richardson, in reference to the above notice, observes,—"Hernandez, Clavigiero, and other writers on California, likewise mention these animals; and Vanegas has given a figure of the first-mentioned one, which has, though evidently on insufficient grounds, been considered to be the same with the Siberian argali, while the one noticed in the latter part of the quotation has been referred to the species described under the name of Rocky Mountain goat. The speckled hair does not agree with any descriptions I have met with of the Rocky Mountain sheep; nor have I heard that black individuals are ever met with in the herds of the Rocky Mountain goat. It is therefore probable that the Californian animals are different from the allied ones which inhabit the more northern parts of the Rocky Mountain ridge. Mr. David Douglas describes Piccolo's sheep under the name of *Ovis Californica*. Pennant, who considers the Asiatic argali (*O. Ammon*) and the Corsican mufro (*O. Musimon*) to be varieties of the same species, says, in 'Arctic Zoology,' that the argali is suspected to be found in California, but not on the best

authorities." We cannot, however, but think that the Rocky Mountain sheep was the animal indicated by Piccolo, nor is the vague term *speckled* any formidable obstacle. The colour of the fur of this animal, which is of a dusky brownish hue, resides in the ends of the hair, and as these are rubbed off during the progress of the winter, the tints become paler, some hairs being worn more than others, giving somewhat of a grizzled appearance, which becomes paler and paler, till in the old rams the coat in spring is almost pure white. That grizzled appearance, or the patches caused by the greater abrasion of the hair in one place more than another, might suffice to lead a person writing loosely, and no naturalist, to call the animal speckled.

Though skins of the Rocky Mountain sheep were brought by Captain Cook from the north-west coast of America, and also imported by the North-West Fur Company, it was not until 1803 that the attention of naturalists was drawn towards the animal by a paper published in the 'Medical Repository of New York,' by Mr. M'Gillivray, who had previously procured skins on the mountains in which the Elk river takes its rise, whence others also have since been procured; as well as from the mountains skirting the south bank of the Mackenzie. From one of the specimens procured by Mr. M'Gillivray, which was first deposited in the New York Museum, and afterwards sent to France, M. Geoffroy published a figure and description in the *Annales du Muséum*, entitling the animal "Bélier sauvage d'Amérique." A fine male and female specimen exist in the museum of the Zoological Society; these were obtained by Dr. Richardson, on the banks of the Mackenzie. From this naturalist we borrow the best description of the habits of this animal which we have yet seen:—

"The Rocky Mountain sheep inhabit the lofty chain of mountains from whence they derive their name, from its northern termination in lat. 68° to about lat. 40°, and most likely still farther south. They also frequent the elevated and craggy ridges, with which the country between the great mountain range and the Pacific is inter-

sected; but they do not appear to have advanced farther to the eastward than the declivity of the Rocky Mountains, nor are they found in any of the hilly tracts nearer to Hudson's Bay. They collect in flocks consisting of from three to thirty: the young rams and the females herding together during the winter and spring, while the old rams form separate flocks, except during the month of December. The ewes bring forth in June or July, and then retire with their lambs to the most inaccessible heights. Mr. Drummond informs me that in the retired parts of the mountains, where the hunters had seldom penetrated, he found no difficulty in approaching the Rocky Mountain sheep, which there exhibited the simplicity of character so remarkable in the domestic species; but that where they had been often fired at they were exceedingly wild, alarmed their companions on the approach of danger by a hissing noise, and scaled the rocks with a speed and agility that baffled pursuit. He lost several that he had mortally wounded, by their retiring to die amongst the secluded precipices. Their favourite feeding-places are grassy knolls skirted by craggy rocks, to which they can retreat when pursued by dogs or wolves. They are accustomed to pay daily visits to certain caves in the mountains that are incrusted with a saline efflorescence, of which they are fond. These caves are situated in slaty rocks, and it was in them alone that Mr. Drummond found the *Weissia macrocarpa* growing. The same gentleman mentions that the horns of the old rams attain a size so enormous, and curve so much forwards and downwards, that they effectually prevent the animal from feeding on level ground. The flesh of the Rocky Mountain sheep is stated, by Mr. Drummond and others who have fed on it, to be quite delicious when it is in season, far superior to that of any of the deer species which frequent the same quarter, and even exceeding in flavour the finest English mutton. The Kamtchatdales in like manner esteem the flesh of the argali as food fit for the gods."

In size the Rocky Mountain sheep, or big-horn (of Lewis and Clark), exceeds the Asiatic argali. An adult

male measures six feet in the length of the head and body, and three feet five inches in height at the shoulder. The horns are much larger in the male than in the female; in the former they are of great thickness, three-sided, furrowed transversely, and curving from their base first backwards, then downwards, forwards, and upwards, until they form a complete turn, during the whole course of which they recede from the head in a spiral manner. In a full-grown male they measure about two feet ten inches, following the curve, and have a basal circumference each of twelve or thirteen inches. In the female they are nearly erect, short, and slightly inclined backwards, and at the tips outwards.

The Nahoor, or Snà, of Thibet (*Ovis Nahoor*, Hodgson), a native of the Kâchar region of Nepâl and the glaciers of the Himalaya.

The Burrhel (*Ovis Burrhel*, Blyth), a species allied to the latter, and inhabiting the highest ridges of the Himalayan chain, where it "bounds lightly over the incrusted snows, at an altitude where its human pursuers find it difficult to breathe. It has the bleat of the domestic species, as indeed they all have, and is very shy and difficult of approach. Flocks of ten or twenty have been observed conducted by an old male, which make for the snowy peaks upon alarm, while their leader scrambles up some crag to reconnoitre, and, if shot at, bounds off a few paces, and again stops to gaze. They pasture in deep and hollow grassy glens." A specimen, in the Museum of the Zoological Society, was shot near the Boorendo Pass, at an altitude of about 17,000 feet.

The Caucasian Argali (*Ovis cylindricornis*, Blyth), hitherto confounded with the Siberian Argali.

The Armenian Argali (*Ovis Gmelinii*, Blyth).—Specimens of this sheep, from Erzeroom, are living in the Gardens of the Zoological Society. "According to Gmelin, this species is found only in the highest mountains in Persia. The males, he informs us, are very quarrelsome amongst each other, insomuch that he had been at one place where the ground had been strewed with horns that had been knocked off in their contests."

It is allied to the Corsican mouflon. "Sir John MacNeill informed me that 'it appears to be the common species of the mountains of Armenia; occurring likewise on the north-west of Persia;' but the wild sheep of the central parts of Persia is evidently distinct, 'having horns much more resembling those of the domestic ram, being spiral, and completing more than one spiral circle. I think I am not mistaken in supposing,' continues Sir John, 'that I have also had females of this species brought to me by the huntsman with small horns, resembling those of the ewes of some of our domestic sheep; but, on reflection, I find that I cannot assert this positively, though I retain the general impression.' It is highly probable that a wild type of *O. Aries* is here adverted to, which would thus inhabit the same ranges of mountains as the wild common goat (*C. Ægagrus*); and with respect to the circumstance of horns in the female sex, I may here remark that this character is very apt to be inconstant throughout the present group."

The Shà (*Ovis Vignei*, Blyth), a mouflon inhabiting the mountains of Little Thibet and the Sulimani range between India and Khorassan. "Vast numbers of this species are driven down by the snow in winter to the branches of the Indus, where the river breaks through the chain of the Himalaya." The wild sheep of the Hindoo Koosh mountains, described in the 'Journal Asiatic Soc. Beng.' for 1840, is either this or a closely allied species. Its climbing powers are extraordinary.

The Corsican Mouflon (*Ovis Musimon*, Linn.), a native of Corsica and Sardinia. Speaking of this sheep, Mr. Blyth remarks—"It has always appeared to me, however, that the specific distinctness of the mouflon is very obvious, and I doubt whether it has contributed at all to the origin of any tame race. That it interbreeds freely with the latter, under circumstances of restraint, is well known; but we have no information of hybrids, or Umbri, as they are called, being ever raised from wild mouflons, though the flocks of the latter will occasionally graze in the same pasture with domestic sheep, and all but mingle among them. The male of this animal is

denominated in Corsica Mufro, and the female Mufra, from which Buffon, as is well known, formed the word Monflon; and in Sardinia the male is called Murvoni, and the female Murva, though it is not unusual to hear the peasants style both indiscriminately Mufion, which (as Mr. Smyth remarks, in his description of that island) is a palpable corruption of the Greek Ophion. It is sometimes stated, but I do not know upon what authority, that a few of these animals are still found upon the mountains of Murcia."

The Cyprian Mouflon, probably different from the preceding, and termed by Mr. Blyth *O. Aphion.*

In this review of Mr. Blyth's paper we have omitted the Ixalas Probaton, Ogilby (of which a unique specimen exists in the museum of the Zoological Society, London, the history of which is obscure), and the Aoudad (*Ovis Tragelaphus*, auct.), which we refer to the goats.

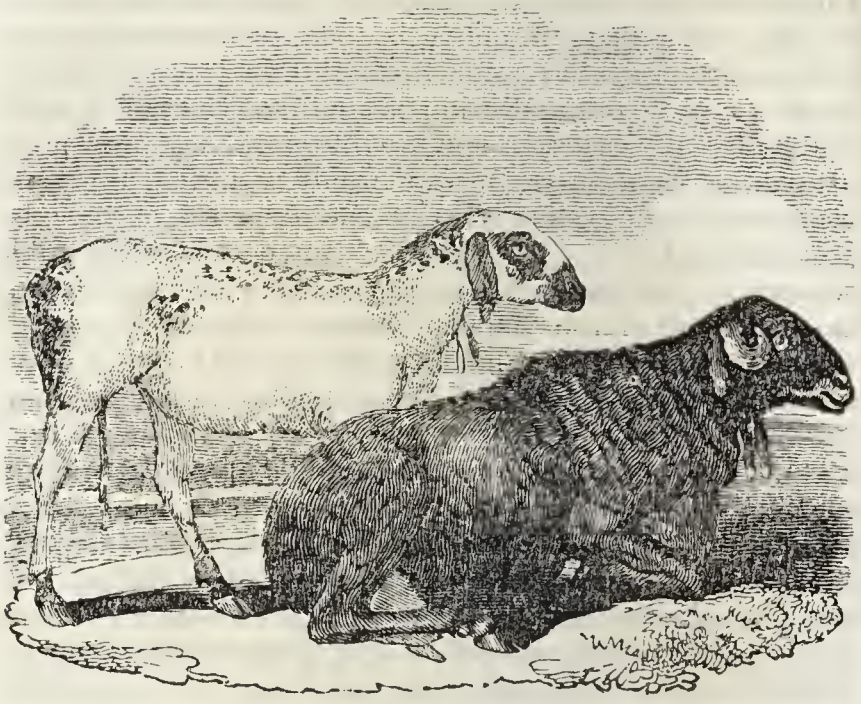
From none of the species here enumerated can we confidently select the type of the domestic sheep (*Ovis Aries*, Linn.).

The Mouflons and Argalis, that is, the wild species of the genus Ovis, are covered with a harsh kind of hair, having beneath it at its roots a short spiral wool, which in winter becomes longer and fuller. Mr. Bell, indeed, considers the harsh hair as essentially wool in its structure, presenting the imbrications which the microscope shows to be the characteristic of wool, and on which its felting property depends; and he regards the short under-coat as composed of hair, and not of wool. Mr. Youatt makes the contrary statement, and notwithstanding the appearances noticed by Mr. Bell, we incline to Mr. Youatt's opinion; for, be it observed, in the Cashmir and the Angora goats the long outer garment is hair; the short under-coat exquisitely fine wool. In other wool-bearing animals, as the beaver and otter, the same arrangement prevails; and we know, moreover, that in some neglected breeds of common sheep the wool becomes mixed with long hairs (not short and fine), which more or less obscure the wool.

The causes which have rendered the fleece of the

European sheep what we now find it are involved in obscurity. We attribute much, in the first instance, to the effects of temperature; for though the merino sheep of Spain (a race originally imported from England), and the flocks of Australia and Southern Africa, are pre-eminent as wool-bearers, yet it would seem that the predisposition to develop wool at the expense of hair is acquired only in temperate, elevated, or even cold climates. For instance, we learn from Mr. Hodgson that the wool of the Bhootan domesticated sheep, called Huniah, is superb, and he adds, the animal is suited only to the northern district of Nepâl, suffering much from the heat of the central district. ('Zool. Proceeds.' for 1834, p. 99.) On the other hand, it is clear that in the early ages of man's history the shepherds must have selected for breeding those individuals on which the wool predominated, and that, by following up this system, the sheep gradually attained its present condition, so that a wool-bearing breed became at length permanently established. Originally, perhaps, the sheep, then a wool-bearer, and long domesticated, was of a brown or rusty black colour, a hue still lingering on the faces and limbs of many of our breeds, and sometimes appearing as the general tint of individuals, thus conspicuous in the midst of their white-fleeced companions. Nine out of ten of the sheep of Deccan are black, with short, crisp, coarse wool.

As the primitive fleece of the sheep was a mixture of hair and wool, we cannot be surprised to find races domesticated in which the hair predominates over the wool, and that so greatly, that they may with propriety be termed hairy. Sometimes the hair is like that of a spaniel dog, long and silky, and many of the flocks of the Bucharian Tartars are thus clothed. To this breed may be referred the Cretan or Wallachian sheep (*Ovis Aries, var. Strepsiceros*), common in Crete, Wallachia, Hungary, and the western parts of Asia. Of this variety a splendid ram from Mount Parnassus was presented by Dr. Bowring to the Zoological Society of London. It was vicious, unruly, and of amazing strength. Its horns



131.—Guinea Sheep.

were very large, and spirally contorted, adding greatly to its striking and picturesque appearance. Its fleece consisted of hair and wool, the former being of great length, perfectly straight, close-set, and beautifully fine, falling from the middle of the back on each side of the animal, almost to the ground. On the face the hair was short, and of a rusty black; on the body it was white. In general, the horns in the male rise almost perpendicularly from the skull, making a series of spiral turns in their ascent, the first turn being the largest, while in the female they diverge, taking a lateral direction. In the specimen, however, to which we have alluded, they extended laterally from the skull, and after the first turn took a downward sweep; variations in these points may be expected in domesticated animals. In some varieties of the Guinea sheep the hair is coarse and often shaggy. In the specimens of Guinea sheep figured (Fig. 131) the limbs are long, the body gaunt, the ears pendulous, the

182.—Persian Sheep and Caracal.

forehead arched, and two fleshy excrescences hung from the throat. A smaller hair-clad breed extends along the Slave Coast. The Fezzan sheep, of which we have seen examples in England, closely resemble the Guinea sheep, but have a pendulous dewlap, instead of the tassels of skin on the throat. They are gaunt, coarse-haired, ill-formed animals, with high withers like a buffalo. The males have small horns. In Madagascar the sheep are covered with short hair. In Persia, Tartary, and other parts of the East, there has long existed a singular variety, with a great deposit of fat on the tail and croup, giving an unsightly appearance to the animal: the tail itself is short, and seems buried in the mass on each side; the body is generally white, the head and neck black: of the variety (*Ovis Aries, var. Steatopygus*) we have seen specimens in the gardens of the Zoological Society of London. Fig. 132 is a portrait of one of these sheep, with a caracal brought from Persia. The fleece of the sheep consisted of short, coarse wool, mixed with hair.

Among other strange varieties of sheep may be here noticed the sheep of Syria and Egypt, with a long tail loaded with fat, which sometimes even trails on the ground. This race (*Ovis Aries, var. Macrocercus*) is closely allied to the preceding. (Figs. 133 and 134.) In the Egyptian animals the tail is broad throughout, but in the Syrian it narrows to a point. The ordinary weight of the tail is fifteen pounds, but in some of the larger kinds, well fattened, the tail will weigh seventy, eighty, and, it is said, even one hundred and fifty pounds. Ludolph saw in Egypt a sheep's tail of eighty pounds' weight. This overgrown tail is a great inconvenience to the animal, and in order to prevent injury to it, the shepherds are often obliged to fix a thin piece of board to the under surface of the part that trails on the ground, to which small wheels are sometimes added. Our figures exhibit the Syrian variety with only a moderate caudal development. The caudal deposit of fat in these varieties of sheep is oleaginous, being of a consistence between fat and marrow, and is often used in the place of butter; when the animal is young, this fat is stated to be little

133.—Fat-tailed Sheep of Syria.

inferior to the best marrow. The long-tailed breed (*var. Macrocercus*) is not only found in Arabia, Syria, and Egypt, but is very numerous in the interior and southern parts of Africa, and is covered with a mixture of coarse short wool and hair.

Before we proceed to take a general survey of the more important breeds of our British sheep, we may observe, that besides the variations to which we have alluded,

respecting fleece and general form, the horns are subject to great difference of size and curvature, and are sometimes wanting in both sexes, sometimes only in the female; while, on the contrary, in some breeds the number of horns is increased beyond the natural allotment.

134.—Fat-tailed Sheep of Syria.

In Iceland and the Feroe Islands there are two races of sheep: one of a small size, and of a dun or rust-black colour; the other of larger size, and white. Both these races are remarkable for the number of their horns, varying from three to eight. Four, however, is the usual number, as in the drawing of the head. (Fig. 135.) Of the larger race we have seen many individuals: they are strongly-built animals, with a coarse fleece, consisting of long hair externally, and an under-layer of close wool, impenetrable by the heaviest rain. The wool, however, is of little value, being fit only for horse-cloths and common rugs. These sheep yield an extraordinary quantity of milk, far superior to that of any of the southern breeds. Von Troil, in his 'Letters on Iceland,' states that a single ewe will yield from two to six quarts a day. In the Feroe Islands is a wild race of sheep, of great an-

135.—Head of Four-horned Ram.

tiquity. They are covered with black, short, curled wool, and their flesh has a peculiarly dark appearance and venison-like flavour.

In 1821 Mr. Trevelyan visited the Feroe Islands, and found the remnants of this wild race, in no way dependent upon or under the control of man. They are sometimes caught by dogs, but can seldom be obtained except by being shot, or intercepted in a narrow space and driven over the cliffs.

Among the breeds of Europe which have attained to

the highest celebrity, and by means of which, through judicious crossing, the sheep of Saxony, Prussia, Austria, and England have been greatly improved as respects the quality of the fleece, is the far-famed Merino of Spain. (Fig. 136.) The term "merino" alludes to the over-sea origin of the race, and there are good grounds for believing that these Spanish sheep are originally of British extraction, being of the old Ryland or Cotswold stock. Stow and Baker, in their Chronicles, say, "This yere (1464) King Edward IV. gave a licence to pass over certain Cotteswolde sheep into Spain." Baker adds, "King Edward IV. enters into a league with King John of Arragon, to whom he sent a score of Costal ewes and four lambs."

There are other breeds of sheep in Spain besides the Merinos, more or less intermixed with them; but of the pure race it is calculated that there are about ten millions, which, excepting perhaps the flocks of Leon and Estremadura, are migratory, and termed transhumantes, being periodically conducted from one part of the country to another, and back again.

These transhumantes are divided into flocks which, under the care of a mayoral, or chief shepherd, and assistants, migrate from the mountains of the north to the plains of the south in winter, and return back to the mountains in summer. The flocks follow the shepherds, who lead the way, and direct the length and speed of the journey: a few wethers perfectly tamed, tread in the footsteps of the conductor, and the rest follow in due order; a powerful breed of dogs accompany the shepherds in order to defend the flock from wolves, and a few mules carry their provision and other necessaries, as well as materials for making up the fold at night.

This migratory system is regulated by a tribunal termed Mesta, which has been of old standing; it can be traced back to the middle of the fourteenth century, at which period definite laws with respect to it were enacted, by which persons were prohibited from travelling along the course of the route pursued by the flocks while the sheep were in motion; it also established a

13 .—Merino Sheep, male and female.

right to graze on all the open and common land that lay in the way ; and moreover it claimed a path, ninety yards wide, through all the enclosed and cultivated country. The journey taken by the Merino flocks is upwards of four hundred miles, which they accomplish in six or seven weeks, and the same time is spent in retracing the route, so that in every year about fourteen weeks (or nearly a quarter) are spent in these toilsome journeys. Popular prejudice in Spain attributes the superiority of the Merino wool to this practice—a practice injurious to the agriculturist, through whose corn-lands and vineyards the flocks pass, and injurious to the keepers of stationary sheep, inasmuch as the common and pasture lands are completely eaten bare by the multitudes that slowly pass over them, while wilfully, or through carelessness, serious damage is done to farms, plantations, fields, and vineyards, for which no redress can be obtained.

It is, however, much to be doubted that the Merino wool owes its superiority, as is asserted by the Spaniards, to this system. The stationary Merinos in Leon and Estremadura produce wool equal in quality to that of the migratory flocks, and these are again exceeded by some of the German Merinos, which never travel, so that at least the advantages of the Mesta system have been overrated, while the evils resulting to the flocks from fatigue, and the injury done to the lands in their course, have been treated with indifference.

In Spain, as in the East from the earliest times, the shepherd leads his flock. In Italy, in Greece, and some parts of France, it is still the custom ; and the reed-pipe of the shepherd may be heard calling the flock together, or the troop seen following him as he leads them to their evening folding-place.

In Piedmont, the fine race described by Pliny long continued to preserve its old reputation ; but of late the Alpine region of Italy has received importations from various countries, and among them flocks of the Merino breed, insomuch that nowhere can the pure relics of an ancient stock be found. In different parts of the Alps the sheep are more or less numerous, and of more or less

value, according to the mountainous character of the country and the quality of the pasturage. In Savoy the necessity of housing the sheep in winter, and the difficulty of providing them with food during that season of the year, tend to circumscribe their numbers; and the few that are kept by the peasants are maintained for the sake of their wool. We copy the following statement from the personal observation of a gentleman. He writes—

"In the mountains of Savoy, although the soft sound of the sheep-bell is often heard, there are no large flocks, as it is absolutely necessary to keep them housed during the severe winter season, and as scarcely any of the peasantry or farmers have the means of thus sheltering them on a large scale.

"There are of course exceptions near the city of Chamberi, and in some other places, but, generally speaking, the Savoyard peasant possesses a small piece of ground capable of cultivation, on which he raises potatoes (now their principal food) in quantity sufficient for his family. The rest of his wealth consists of a few sheep and goats, a cow, or perhaps two or three cows, and an ass. The cows and the goats give their milk, the sheep their wool (of which the primitive clothing of the Savoyards is chiefly made), and the ass serves to bring home the dried leaves of autumn, the winter food of the sheep and goats, to carry wood for fuel, and to do sundry other useful duties. A pig or two are sometimes added to these possessions. The interior of a Savoyard cabin, where most of these domestic animals are frequently found lodged as forming part of the family, presents a curious scene to the stranger. The writer of this had once the fortune to pass a night in such a dwelling. On returning home from an excursion in the neighbouring mountains he felt himself so fatigued, and the night was so advanced, that, instead of going on to Lanslebourg at the foot of Mont Cenis, where, at that time (1819), there was a tolerably comfortable inn kept by an Englishwoman, he accepted the invitation of some peasants, who had been his guides and only companions, to stop

short at their abode at Lanslevillard, a small village not far from Lanslebourg. He had found the poor fellows civil and obliging, active and sufficiently intelligent, and was also glad to see more of them and their way of living. A path, scarcely discernible through the snow which had fallen (the season was November), led to a group of low cottages, central among which was the residence of his hosts, which seemed the most considerable of them. Before it there was a yard, shut in with hurdles and a gate, and on one side of it was a pig-sty (the pigs not having here the honour of the *entrée*), and on the other a low shed, joined to the cottage for warmth and comfort.

"Within the cottage was a tolerably large room, where, by a fire, rather small for the season, and which had its back towards the cow-shed, two women sat spinning with the distaff, and a little boy playing with a venerable-looking goat.

"The fire was speedily renewed, and an old cauldron put over it to cook the supper. This meal consisted of boiled potatoes, boiled milk, some slices of bread chopped from a loaf as hard as a millstone, and almost as big, but much darker in colour, and a few chestnuts, the last fruit being part of a valued hoard annually imported from the Italian country of Piedmont, on the other side of the Alps. They had no wine, beer, or spirit,—no liquids whatever, save water and milk; all their stores were produced for the stranger, and if a king had been their guest they could not have furnished another luxury. It was, however, more than enough to excite the appetite of a less hungry or more fastidious traveller, to see the zest with which the poor Savoyards partook of these goods. The supper, in honour of the guest, was, no doubt, to them one of unusual excellence.

"After many excuses had been made as to accommodations, a bundle of clean straw was carried into a small inner room. The bed or bed-place in this apartment was built against the wall like a berth on board ship, and still more like the dormitories used by the Scottish peasants, which recesses are shut up by daytime, or par-

tially closed when the nights are very cold, after the fashion of presses or cupboards. In this recess, after driving out of the room three or four sheep and a goat, the Savoyards laid the straw; over the straw they laid some sheep-skins, which, with the addition of an old grey cloth coat, were all the materials they could furnish as sheets, blankets, and coverlets.

"The bed, however, was sufficiently warm and comfortable, and the traveller slept very well, his only annoyance arising from a frolicsome young goat who did not like to be dispossessed of what was probably his usual quarters. This agile creature contrived to open the room-door, which was closed only by a wooden latch, and presently after jumped into the sleeping-place, where he amused himself by tugging the straw from beneath the stranger, and playing other tricks, until he was forcibly ejected, and the room-door secured by means of the iron point of the traveller's alpenstock.

"The *réveillée* in the morning was striking to the stranger: the cows lowed, as if they were close to his bed-head; the sheep bleated, the ass brayed, the goats capered, the pigs squeaked—all seemingly under the same roof. These creatures were calling for their breakfast.

"Nearly every part of the dress of a Savoyard peasant is produced from his own little flock. He dresses the wool himself, his wife or daughter spins it, and then the yarn is woven into cloth by the village weaver. The holiday coats are generally dyed blue, but those of every day wear are of less expensive colour. As they have plenty of black sheep in Savoy, they mix their wool with the wool of the white sheep, and, spinning them together, produce a sort of grayish brown cloth without the expense of dyeing. In another part of the Alps, the Grisons took their name from their custom of wearing gray cloth similarly manufactured.

"As soon as the severity of winter is passed, the Savoyard turns out his cows and sheep, esteeming himself fortunate if his provision of hay for the cows, and dried leaves for the sheep has sufficed for the time he

has been obliged to keep them under his roof. At first they graze in the low valleys near the villages, where the snow first melts, and by degrees, as the verdure succeeds the wintery covering of the mountains, they ascend higher and higher. They are, however, almost invariably driven home for the night, even during the summer season. This duty falls to the women and girls, and few scenes can well be more soothing and pastoral than those which the traveller is almost sure to meet on approaching a small Savoyard town or village towards the sunset of a summer's day. From all sides small flocks of sheep and goats, with a cow or two, and generally a few pigs, descend the hill-sides towards the homesteads, conducted by women and girls, who are always busily employed as they walk along, either in platting straw, or in knitting, or in spinning wool or flax with the distaff."

In Greece it is usual, as formerly, to give names to the sheep, which they know and will answer, coming to the shepherd when called. Fig. 137 represents the pleasing spectacle of sheep thus conducted, and on terms of familiarity with their leader, whose voice they obey, though "they know not the voice of strangers."

Reverting from foreign sheep to those of our own island, we may remind the reader that we possess several different breeds, distinguished by different qualities, both as regards form and size, and the characters of the wool. These breeds, or varieties, are the result of skilful treatment, of pasturage, and judicious crossings.

We may divide them into three groups: the short-woolled, the middle-woolled, and the long-woolled breeds.

The short-woolled breed formerly included many varieties, now, from the improvement of their fleece, to be ranked under the second division, as the South-Down, Norfolk, and Cheviot sheep. It is at present, however, represented by the Anglo-Merino race, to which the sheep of New Holland and Van Diemen's Land also belong. The average length of the wool is about two inches and a half, and its texture is peculiarly fine, soft, and even silky. Short wool is used in the manufacture of delicate and beautiful fabrics; it is, however, generally

137.—Oriental Shepherds.

mixed with wool of a longer staple. The Saxony wool, so valued for its fineness, comes under the present division: it is shorter and finer than the Australian wool, but less silky, the serrations of the fibre being more numerous, and disposing it to felt more closely. Hence Saxony wool is the most valuable for the manufacture of fine broad-cloth.

The average weight of the fleece of the Australian short-woolled sheep is from three pounds to three and a half; sometimes it amounts to five.

"There is no wool," says Mr. Hughes, "which spins so well as the Australian; large importations are annually sent to the British market, at an average of 2*s.* 6*d.* per pound. In 1833 the quantity imported from New South Wales and Van Diemen's Land amounted to 3,516,869 pounds." The quantity has since increased very largely.

It has been the object of the British wool-grower to convert the short-woolled breeds into a race with wool which, while its length is increased, preserves its original fineness and delicacy. Thus we have now, in place of the old short-woolled breeds, a middle-woolled race of great value, and of which the fleece is in the highest request.

The middle-woolled sheep include the South-Down, the Dorset, the Norfolk, the Suffolk, the Ryland, the Welsh, and the Cheviot breeds, together with several others, and which were formerly short-woolled. The length of the staple is, on the average, three and a half or four inches.

That the improvement of the old short-woolled sheep into a middle-woolled race is an advantage in every sense, especially as the short wool used exclusively in the manufacture of fine cloths is abundantly supplied from foreign "growers" (as the term is), no one can doubt. Of this race, one of the first is the improved South-Down breed depasturing on the long range of chalky hills extending from the sea-coast of the Isle of Thanet, and the cliffs of Dover, through Kent and Sussex. Formerly this breed, as Mr Ellman states ('Library of Agricultural Know-

ledge'), was a small size, far from possessing a good shape, and late before they were capable of being fattened; now, however, they are greatly improved both in shape and constitution. "They are smaller in bone, equally hard, with a greater disposition to fatten, and much heavier in carcase when fat. They used seldom to fatten till they were four years old, but it would be a rare sight to see a pen of South-Down wethers at market more than two years old, and many are killed before they reach that age." The South-Down sheep is in fact the model of what a hill sheep ought to be, and the flesh in fineness of grain and flavour is peculiarly excellent. The wool is of a very useful quality, but is both larger in fibre and less numerously serrated than the short Saxony, and does not therefore possess such a felting power; hence it is rarely used in the manufacture of fine broad-cloths. Still from its fineness and felting powers, compared with the wool of many other middle-woolled breeds, it is highly esteemed—and for flannels and worsted goods in general is extensively employed. In Surrey, Hampshire, and Berkshire, the South-Downs have either superseded or been blended with the old short-woolled sheep.

Dorsetshire possesses its own breed, encroached upon, however, by the South-Downs. The males have large, spirally-twisted horns, and the females have also horns, but much smaller than those of the male. Neither the wool nor the flesh equals that of the South-Down breed. The old Norfolk breed of middle-woolled sheep is very valuable, but it is rapidly giving way to the South-Down. The rams are distinguished by long spiral horns, those of the ewes and wethers being smaller; the flesh is remarkably fine, and the wool delicate, and felts well. The figure of these sheep is tall and slender; the legs are long, and the face and limbs black or mottled. The general aspect is wild and animated. This breed thrives on the coarsest pasturage. The wool is not used in fine broad-cloths, but is used in such as are of inferior quality, and in woollen stuffs generally.

In Suffolk the South-Down breed prevails. The

black-faced and horned sheep of Westmorland, Cumberland, and various parts of Scotland, as Lanarkshire, belong to the middle-woolled section. With respect to their wool, these sheep do not rank high; it exceeds in length that of the middle-woolled breeds generally, but is harsh and coarse; to compensate for this these sheep are very hardy, have an admirable contour, and the flesh in fineness of grain and delicacy of flavour equals either the South-Down or the Welsh mutton.

The Cheviot breed is very distinct from the common mountain or black-faced race, with which it is on all sides immediately surrounded, these two races dividing the North between them.

The Cheviot breed is hornless, and the general contour is excellent; the shoulders are full, the body round and long, and the limbs small-boned. The mutton is in great esteem; and the wethers average sixteen, eighteen, or even twenty pounds weight per quarter. It appears, from the testimony of practical farmers, that the attention paid to the improvement of this breed, in reference to the condition of the carcase, has been followed by a deterioration in the quality of the wool, which is said to have been formerly capable of entering into the manufacture of fine cloths. Still, however, the wool is good, though inferior to that of the South-Downs. It far surpasses that of the black-faced breed, and as the Cheviot race is equally hardy and as capable of sustaining cold as the former, and is content with the alpine plants of the bleak hills and mountains, it will soon supersede the black-faced breed, as it has already done in the forest of Ettrick and the whole of Selkirkshire, and even Sutherland. The foreknowledge which these sheep possess of approaching storms, and the assiduity with which, while the shepherd dreams of no impending evil, they will seek a place of shelter and security, are curious traits in their history. It is thus that they often warn the shepherd, by the display of this instinct, wisely implanted within them, and lead him to add his precautions to those which they have themselves adopted. In spite, however, of the vigilance of the shepherd and the instinct

of the sheep, many often perish, buried beneath towering snow-drifts, and sometimes whole flocks are lost. It often happens that sufficient shelter cannot be obtained, the flock crowd together for the purpose of mutual warmth, and are soon covered beneath the snow. If this does not occur, the lambs, unable to endure the severity of the storm, perish, and the mothers, bewildered, wander about seeking their offspring, till they themselves sink exhausted with their efforts and distress. With but little food sheep can remain for many days buried beneath the snow; but where this cannot be obtained, the period of endurance is proportioned to the strength of the animal's constitution and the intensity of the cold. In the winter of 1800 a sheep near Kendal was buried in the snow for thirty-three days and nights, without the possibility of moving, and yet survived; and a sheep in Cumberland was buried for thirty-eight days. When extricated it was found to have eaten the wool off both its shoulders, and its frame was reduced almost to a skeleton. By due attention, however, it gradually recovered.

Having thus specified some of the more important of the middle-woolled breeds of sheep in our island, most of them, or all, derived from the old short-woolled breeds by a system of judicious management, we shall now take a hasty survey of the long-woolled breeds.

As we have already stated, the middle-wool varies in different breeds in fineness and in its power of felting. Long wool is much more uniform, and for this reason, that it is the produce of the Leicester race, and of races with which the Leicester race has become completely intermingled. "All long-woolled sheep," says Mr. Youatt, "both in appearance and in fleece, are becoming one family." Long wool, which has lately very much improved, it being the aim of the breeder to render it finer (at the expense of its length, which it will bear), is characterised by strength and transparency, but it is deficient in the power of felting. Its average length is about eight inches. This applies more particularly to that sort called the long-combing wool; there is, how-

ever, a variety of long wool which approximates to the middle wool, and termed the short-combing wool, which is somewhat shorter than the other, finer, and more disposed to felt. The long-combing wool is used in the manufacture of hard yarn, and for purposes in which length and firmness are essential; the other for stuffs of a softer texture, and for hosiery goods. We have alluded to the Leicester breed as the typical example of the long-fleeced races, but it is to be observed that this breed is an improvement upon the heavy, ill-made, and coarse-woolled race, formerly spread over all our midland counties. Lincolnshire also had a breed of sheep celebrated for their fine long wool; but this breed, defective in form, and yielding mutton of inferior quality, is now greatly improved, and in fact is blended with the new Leicester sheep.

It is not within our province to follow out the changes which have already taken and are still taking place among the long-woolled breeds of sheep for which our island is expressly celebrated, and in which neither France nor Belgium can at all compete with the English sheep-graziers. To those who wish to gain an acquaintance with this part of the subject, we recommend Mr. Youatt's valuable work on sheep, where he will find much information and abundant reference to various writers on agricultural topics.

There is, however, one question which suggests itself, and which we cannot omit to notice. As far as records serve us, it would seem that a long-woolled and a short-woolled (now middle-woolled) race of sheep have tenanted our island from the earliest times. Now to what are we to attribute this original difference? Are the two races descended from different primitive sources, or have food and soil gradually produced the differences which have been so long maintained? No one, we think, will hesitate to say the latter; impossible as it may be to follow step by step the progress of the change, or to determine the *modus operandi* of the causes contributing to effect it. It is, however, very remarkable that it is only in animals which have been so long domesticated that we

cannot tell their primeval origin, and which there is reason to think are factitious beings (that is, the produce of different, but still closely-allied species commingling together), that these extreme variations as to size, figure, and length and quality of fur are most decidedly observable. We see these varieties in the dog—from the silky long-haired spaniel of Spanish race, to the close-haired old setter of the same country; from the woolly French poodle, to the mâtin; from the rough English water-dog, to the mastiff: so in the sheep we find a short-fleeced breed, with the filaments of the wool peculiarly fine and numerously serrated; a still longer-fleeced breed, again subdivided into many minor varieties, and having the wool fine, and more or less capable of felting, or, in other words, more or less numerously serrated; and a long-woolled race of old standing, in which the wool, but thinly serrated, is inferior in felting properties, but of great value to the woolcomber. But further, as the mixture of a long and silky-haired breed of dogs with one of close hair does not improve the coat, the young resembling some the male, some the female, but not equalling them in their excellences; so the crossing of long-woolled and short-woolled sheep leads to no good results; and, as with dogs, the improvement of each breed depends on a judicious and careful selection of the best and purest of that breed, by which the properties distinguishing it may be developed to their maximum in their progeny.

In England the sheep is now only valuable for the sake of its wool and flesh, but in various parts of both Europe and Asia the milk of the ewe has been used from the earliest times, either pure or curdled, as an article of diet. Formerly, in many parts of England, cheese was made from the milk of the ewe, and the ewes, to the injury of the lambs, were milked regularly, as described in the 'Odyssey,' and, at a later era, by Virgil:—

"He next betakes him to his evening cares,
And, sitting down, to milk his ewes prepares:

Of half their udders eases first the dams,
Then to the mothers' teats submits the lambs.
Half the white stream to hardening cheese he press'd,
And high in wicker baskets heap'd; the rest,
Reserved in bowls, supplied the mighty feast."
Pope, *Odyss.*, lib. ix.

To the process of shearing we need scarcely allude; all are familiar with the manner in which the removal of the fleece is effected, and it would seem that in the earliest patriarchal ages the same process was in use. Among the Romans, however (and the practice has been but lately discontinued in the Orkney Islands, and is, perhaps, still prevalent in Iceland), the wool was torn off the animals, and, as Pliny states, they were kept for three days previously without food, in order that the wool might be the more easily detached, their bodies being exhausted. In his time, however, the practice of shearing had begun to supersede this cruel and unjustifiable method. It gave, however, origin to the word *vellus* (fleece), from *vello* (to pull away), and the hill termed Velleia was the ancient spot on which this cruelty was perpetrated.

With us the season of sheep-shearing is a season of rejoicing, and the manner in which the important work is conducted, and the dexterity of the shearers, are, to those not accustomed to rural life, replete with interest and amusement. It is, indeed, a pleasing spectacle to see a large flock of snow-white sheep collected together, and in turn losing their soft fleece, rolled into an unbroken and well-arranged whole, beneath the shears of the shearer: the picture is full of poetry, and he must be destitute alike of taste and patriotism that can look coldly upon it.

To enter into a disquisition on the commercial importance of the sheep, its connexion with national prosperity and international relationships, is not our place. We leave this to the political economist.

Before we close, let us again revert to our starting-point—the question as to the origin of the domestic sheep. It is clear that we cannot identify it with any wild spe-

cies with which we are yet acquainted. If such exists, it is most probably to be found on the mountains of Armenia—but this is problematical; and there is some ground for supposing that, though the sheep of every region intermingle with each other, they have descended from different primitive origins. The subject is full of obscurity. It is, indeed, strange that, while history teems with the accounts of battles, massacres, invasions, the reigns and the crimes of kings, it throws no light upon the domestic animals which man has reclaimed. The motives which led man to attempt this important work, the manner in which he accomplished it, the characters and native abodes of the species selected, are buried in silence. The subject was too mean for history —the actors too humble to be noticed; but thus it ever is, that the glare of mighty deeds effaces the record of the useful, the beneficent, and the truly great.

GENUS BOS.—OXEN.

Horns in both sexes. Neither suborbital sinus, interdigital fossæ, nor inguinal pores. Teats in females, four. The animals of this genus are, with some few exceptions, the largest and most massive of the hollow-horned Ruminants; their limbs are low and strong, their body heavy, with wide haunches, and thick and often elevated shoulders; the head is large, and furnished with horns common to both sexes; their progressive increase being marked by annuli at the base. They sheath a hollow or cancellous bony core, continued from the sides of a bold frontal ridge. The forehead or chaffron is expanded; the muzzle, except in the subgenus *Ovibos*, is broad, naked, and moist; the neck is thick, deep, compressed laterally, carried horizontally, and furnished with a pendent dewlap. The spinous processes of the anterior dorsal vertebræ, at the withers, are very long and stout.

Fig. 138 represents the dentition of the Ox, in two views of the upper and under jaw; Fig. 139 is a very characteristic delineation of the skeleton of the English short-horned Cow; and Fig. 140 is a representation of

138.—Dentition of the Ox.

the osseous structure of the Fore-foot (*a*) and of the Hind-foot (*b*) of the Ox. All the Ox group are gregarious in their habits, and no quarter of the globe is destitute of its indigenous species, existing in a state of freedom, tenanting the deep glades of the forest, or roaming over hills or plains :

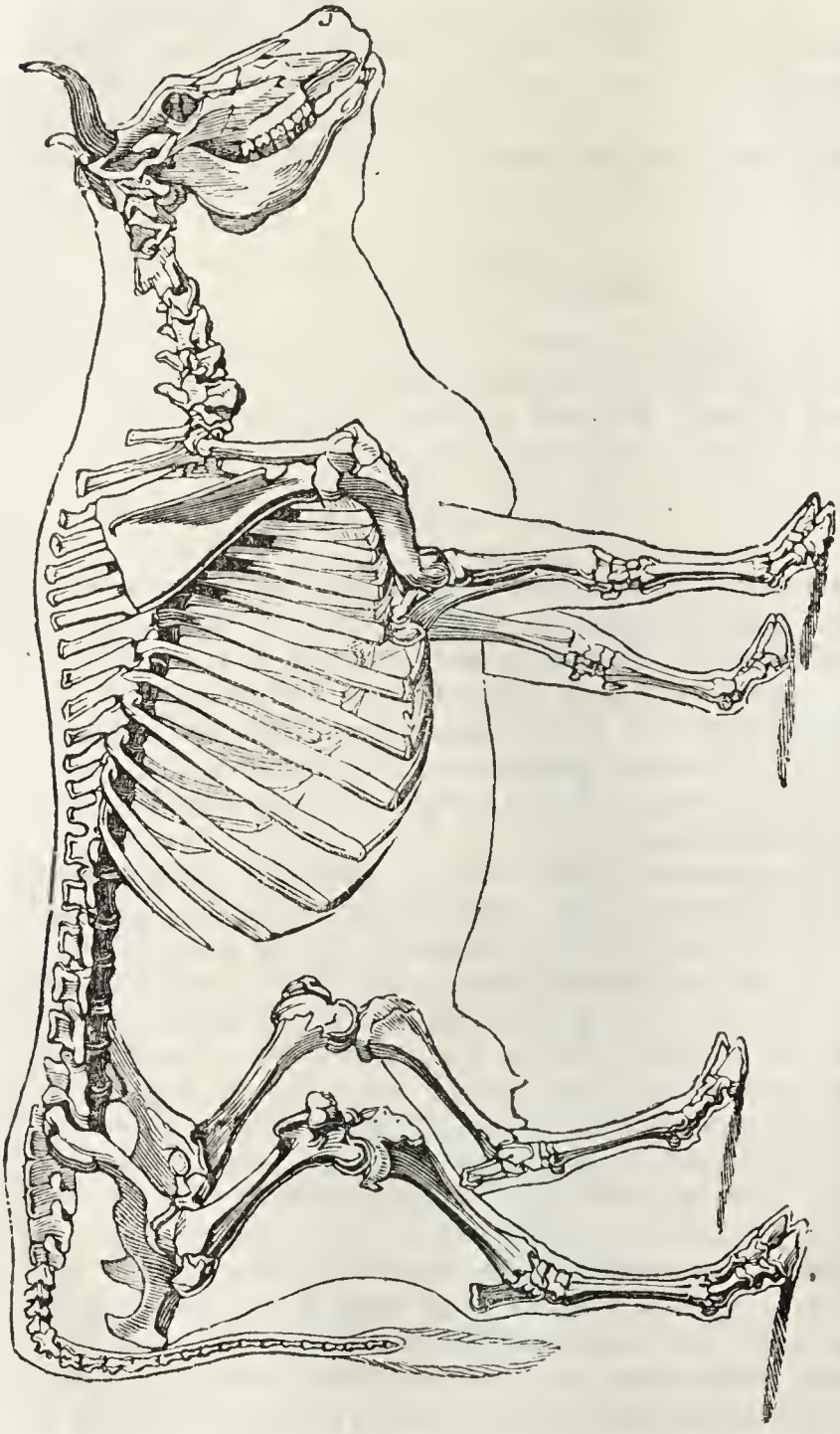
"Villosi terga Bisontes
Latisque feri cornibus Uri."

The genus Bos may be subdivided into the following minor groups, or subgenera : *Bos*, *Anoa*, *Bubalus*, *Bison*, and *Ovibos*. Of each of these minor sections we shall give the most interesting examples.

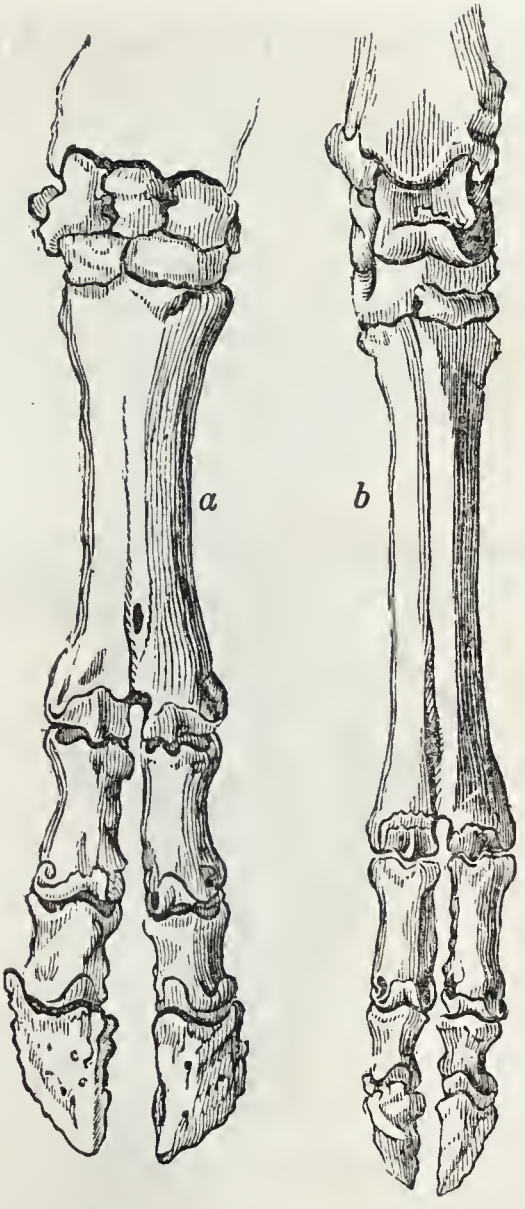
The Ox (*Bos taurus*)

is now only known as a domesticated animal, spread far and wide through almost every region of the globe, contributing by its services and products to the well-being of man. Although referred to as a domestic animal in the earliest ages by the author of the Mosaic record, impenetrable darkness hangs over its primeval history, nor know we what is its wild origin, nor whether that origin is in existence.

Temperature, soil, food, a thousand circumstances operating through the revolutions of years, have combined to effect a series of modifications in the ox ; every country possesses its peculiar races, and these races, by their intermixture, are perpetually producing others, so that it is impossible to say to what extent these changes may be carried, and how far the original type has become already modified. Certain it is that we are acquainted with no animal in a state of original independence to which we can refer as the primitive type of the ox. It is true, however, that within the period of authentic history certain wild oxen existed in Europe ; but it is not to Europe that we must look as the cradle of the domestic ox, nor indeed are the accounts left us of these oxen reconcilable with any of them being specifically identical with our domestic race, which indeed, when we



139.—Skeleton of Cow.



140.—Hind and Fore Feet of Ox.

look at the Zebu breeds, seems to claim more than one source. One of these wild animals was termed by the ancients Urus (*latis cornibus*), and another Bison (*jubatus* or *villosus*); we have also an animal described under the name of Bonasus (Βόνασσος or Βόνασος, Aris-

totle). A few observations on these animals may not be uninteresting. The urus, which existed in the Hercynian forest, is thus described by Cæsar: "These uri are little inferior to elephants in size, but are bulls in their nature, colour, and figure. Great is their strength, and great their swiftness; nor do they spare man or beast when they have caught sight of them. These, when trapped in pitfalls, the hunters unsparingly kill. The youths, exercising themselves by this sort of hunting, are hardened by the toil, and those among them who have killed most, bringing with them the horns as

141.—Skull of fossil Aurochs.

testimonials, acquire great praise. But these uri cannot be habituated to man, or made tractable, not even when young. The great size of the horns, as well as the form and quality of them, differs much from the horns of our oxen. These, when carefully selected, they ring round the edge with silver, and use them for drinking at their ample feasts." Perhaps the wild bulls with horns of

extraordinary size which Herodotus assures us inhabited Macedonia, as well as did the lion, were uri.

The *Bison jubatus* of Pliny.—This species, regarded by Cuvier and most naturalists as identical with the bonasus of Aristotle, is considered, and perhaps with reason, as referable to the Aurochs or Zubr (*Bos urus* of

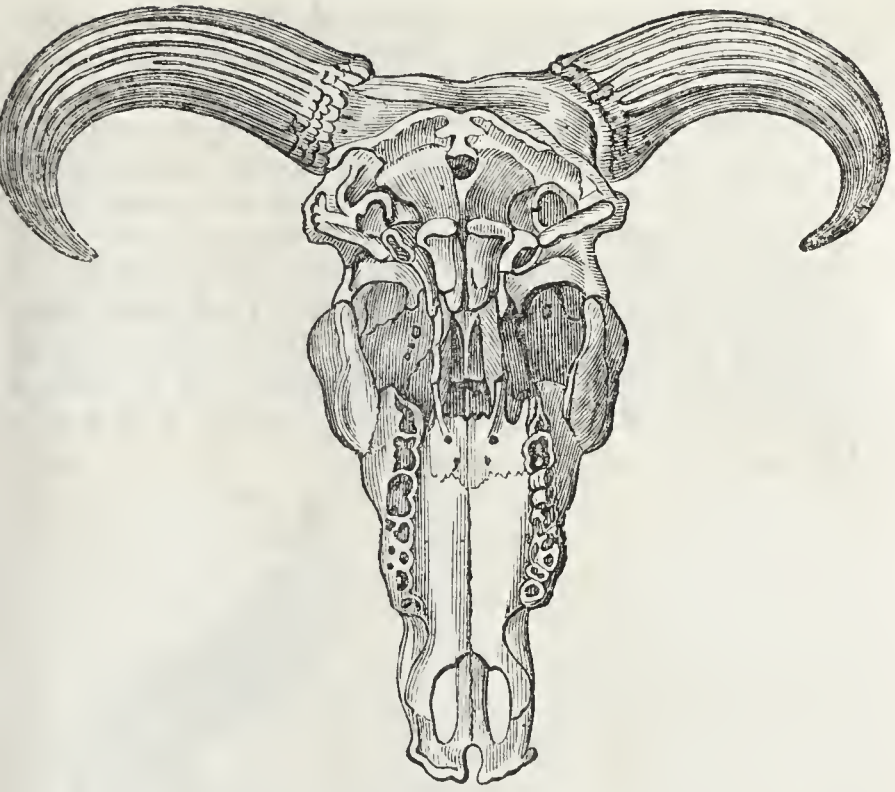
142.—Side view of Skull of fossil Aurochs.

modern naturalists, not the urus of Cæsar) still existing in the wild forests of Lithuania. In Europe and Siberia the fossil crania of an aurochs are not uncommon, and these skulls, though they scarcely differ in anything from the Lithuanian animal, Cuvier inclines to believe may be of a different, though closely-allied species. He gives the figures of a skull in the Paris museum, here copied (Fig. 141, front view; Fig. 142, lateral view), so like, as he observes, to the living aurochs, that the most practised eye can scarcely distinguish it; and also so fresh, that he is in doubt whether it be really a fossil relic,

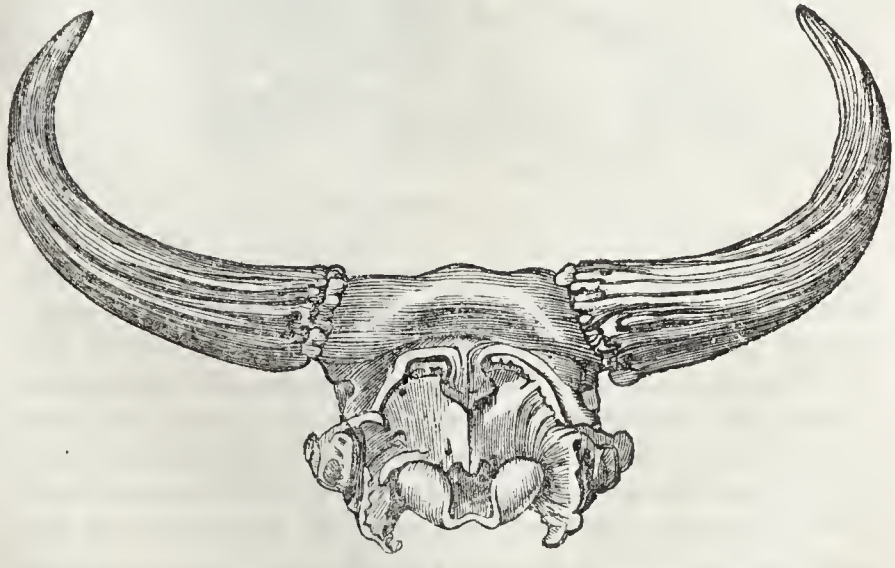
or, on the contrary, recent, owing its fossil appearance to having been much weathered. Sir C. Lyell states that the bones of the aurochs (or bison) have been found in the North Cliff in the county of York, in a lacustrine formation, in which all the land and fresh-water shells, thirteen in number, can be identified with species and varieties now existing in that county. To return to the urus of Cæsar and the ancients. We have stated this animal to be characterized by the immensity of its horns,

143.—Skull of Bos primigenius. Front view.

and its vast stature, in which former particular it differs materially from the ancient full-maned bison, or Lithuanian aurochs. This urus no longer, as it would appear, exists; but fossil skulls of a species far exceeding the largest domestic ox in magnitude, with the core of massive horns, are abundant in the superficial strata of

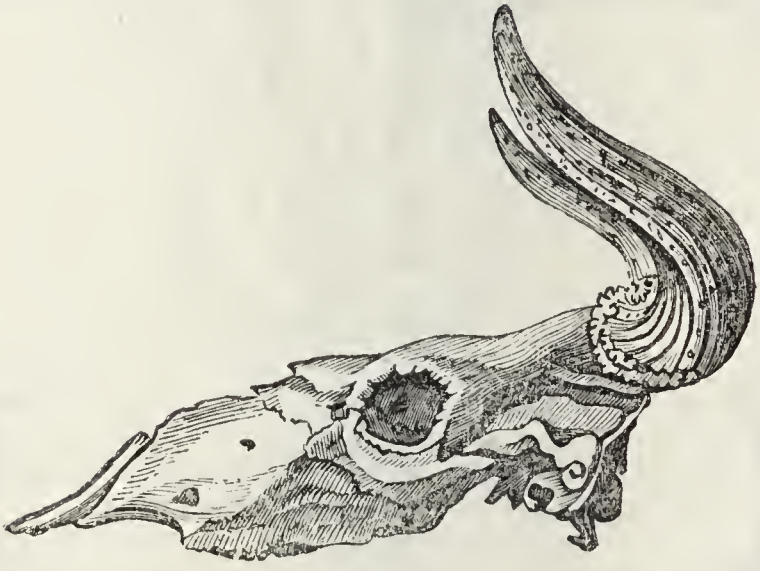


144.—Palatal view.



145.—Back view.

Europe. This species is termed by Cuvier *Bos primigenius;* and he carefully distinguishes the skull from that of the fossil aurochs. In a specimen found at Melksham, and described by Mr. Woods, the cores of the horns measured at their widest expansion upwards of four feet; we may easily conceive what must have been the expansion of the horns themselves: the skull, destitute of the lower jaw, and not perfect otherwise, weighed sixty-three pounds. Larger specimens, however, have been discovered. Fig. 143 represents a front view of the skull of *Bos primigenius;* Fig. 144, a palatal view; Fig. 145, a back view; Fig. 146, a profile.



146.—Profile.

This extinct species Cuvier regards as the type of the domestic ox, in which opinion Mr. Bell and most naturalists coincide, at the same time that they consider the "celebrated white wild oxen of Craven, of Chillingham Park, and Scotland, as specifically the same with the common ox; on the contrary, Col. Hamilton Smith and Mr. Swainson regard the white ox of Chillingham Park (*Bos Scoticus* of some authors) as distinct from the common ox. The former regards the Chillingham ox

as a white variety of the fossil species, *Bos primigenius;* while Mr. Swainson believes it to be the descendant of a smaller species belonging to the same genus as the *Bos primigenius* or ancient urus, of which "the skulls exhibit the type of a form essentially different from that of the domestic ox."

"All these skulls," he continues, "are nearly one-third larger than those of the *Bos taurus;* they are square from the orbits to the occipital crest and somewhat hollow at the forehead. The horns, placed at the side of the above crest, show a peculiar rise from their roots upwards; then bending outwards, and then forwards and inwards. No domestic races show this turn; but numerous specimens of inferior sizes, found fossil in the Cornish mines, have this shape, and the wild bull of Scotland, the only example of this type now known to exist, retains it. The domestic oxen, on the contrary, of whatsoever country or breed they may be, have the square concave forehead, with the horns rising from the ends of the frontal ridge. . . . . It appears, then, that the ancient urus, or wild bull, was a perfectly wild, savage, and untamable animal: not only does every account handed down from remote antiquity assure us of this, but it is even verified by the only living example of this form we possess, the *Bos Scoticus,* still preserved in one or two of the northern parks. Although domesticated so far as to live within such precincts without absolute unprovoked violence to its keepers, it retains essentially all the savage characters ascribed to the more powerful species mentioned by the ancients."

Now, as to the specific identity of the white oxen of Chillingham with our ordinary breed, we have no doubt on the subject; in size, form, and aspect, they resemble the finer breeds of black cattle, and the query is, not—Are they distinct? but—Are they the descendants of a wild breed, or, on the contrary, the descendants of domesticated individuals, which have resumed their wild character, "from having ceased to feel through many generations the effects of human domination?" We suspect the latter. With regard to Cuvier's *Bos primi-*

genius, granting it to be the urus of Cæsar, we are not quite so sure that it was the wild type of the domestic ox. Its vast size, and the extraordinary magnitude of the horns, to say nothing of its ferocity, and the probability that it is to central Asia, rather than to the wild forests of central Europe, that we ought to look for the type of the domestic race (or races?), are sufficient to induce a doubt.

The term urus is evidently identical with the terms auer, ur, auerochs, ure-ox, the root also of the word taurus; and we agree with Mr. Woods in the belief that the aurochs, or ure-ox, of the ancient Germans, was the urus of Cæsar, but that the word, on the extinction of that animal, became transferred to the bison of the ancients, now known as the aurochs, and also under names derived from a different root, as zubr (Lithuanian), zimbr (Moldavian), bison, vison, wisont, and wisant, whence bonasus, monasus, &c.

Besides the *Bos primigenius*, the following fossil species of ox have been named:—*Bos trochocerus* (Hermann von Meyer, subapennine beds; *Bos* (*Bison*) *priscus* (Bojanus), Buffle fossile de Sibérie (Cuv.), *Bos latifrons* (Harlan), Broad-headed fossil Bison and Bison fossilis, "diluvium" of Europe and North America, bone-caves and bone breccias; *Bos* (*Bison?*) *bombifrons* (Harlan), Big-bone-lick, North America; *Bos Pallasii* (Dekay), *Bos moschatus fossilis? Bos canaliculatus* (Fischer)? Siberia and North America; *Bos velaunus* (Robert), Cussac, Haute Loire.

Abundant remains of the ox were found by Capt. Cautley in the Sewalik Mountains, at the southern foot of the Himalayas, between the Sutlej and the Ganges, partly lying on the slopes among the ruins of fallen cliffs, and partly *in situ* in the sandstone, in company with the bones of mastodon, elephant, rhinoceros, hippopotamus, hog, horse (comparatively scarce), elk, deer, several varieties; carnivora, canine and feline (comparatively scarce); crocodile, gavial, emys, trionyx, and fishes. There were also portions of undescribed mammalia.

The Wild White Cattle of Chillingham Park

(*Bos taurus*, var. *Scoticus*).

Having thus introduced this beautiful breed of cattle to our readers' notice, we shall proceed to a few interesting details respecting its history.

Mr. Youatt, in his admirable work on cattle ('Library of Useful Knowledge'), clearly expresses his belief in the identity of the wild breed with our domestic races, and adds that the slightest observation will convince us that the cattle in Devon, Sussex, Wales, and Scotland are essentially the same breed changed by soil and climate, yet little changed by the intermeddling of man.

"Every one who has had opportunities of comparing the Devon cattle with the wild breed of Châtelherault Park, or Chillingham Castle, has been struck with the great resemblance in many points, notwithstanding the difference in colour." In another place the same writer says, "To the Principality we naturally look for some trace of the native breed of cattle, for the Welsh were never entirely subdued by any of the early invaders. The Romans possessed merely a portion of the country; the Saxons scarcely penetrated into Wales, or not beyond the county of Monmouth. The Welsh long resisted the superior power of the English under the Norman kings, and it was not till late in the thirteenth century that the Principality was annexed to the crown of England. We therefore expect to find more decided specimens of the native productions of our own island, nor are we altogether disappointed. Howell Dha, or Howell the Good, describes some of the cattle in the tenth century as being white with red ears, resembling the wild cattle of Chillingham Castle. An early record speaks of a hundred white cows with red ears being demanded as a compensation for certain offences against the princes both of North and South Wales. If the cattle were of a dark or black colour, a hundred and fifty were to be presented. When the Cambrian princes did homage to the king of England, the same number of cattle, and of

the same description, were rendered in acknowledgment of sovereignty. Speed tells us that Maud de Breos, in order to appease King John, whom her husband had offended, sent to his queen a present from Brecknockshire of four hundred cows and a bull, all white with red ears. Whether this was the usual colour of the ancient breed of Welsh and British cattle, or a rare variety esteemed on account of its beauty, and chiefly preserved in the parks of the nobles, we are unable to determine. The latter is the most probable supposition; and the same records that describe the white cattle with red ears, speak also of the dark or black coloured breed which now exists, and which is general throughout the Principality." As a further point in favour of the probability of the white wild cattle being specifically the same as our domestic races, we select the following quotation from the work above referred to: "The colours of the improved short-horns are red or white, or a mixture of the two, combining in endless variety, and producing very frequently a most brilliant effect. The white, it is very probable, they obtained from an early cross with the wild breed, and whenever this colour shows itself it is accompanied more or less with a red tinge on the extremity of the ear, a distinctive character also of the wild cattle."

Are then the wild cattle of Châtelherault Park, Lanarkshire; of Chillingham Park; Lime Hall, Cheshire; and other places, the descendants, as Mr. Youatt seems to infer, of these white cattle of ancient race, so valued in early times? or are they descendants of the wild breed which at an early period tenanted the great forests of our island, and which, as the forests became cleared and the land cultivated, were gradually thinned, till at length their remnant found in the chace or park of the nobleman that safety which as old denizens of the soil they might well claim, and but for which the breed would long since have been utterly extirpated? Again, was the wild breed which roamed the Caledonian forest, and the great forest north of London, so late as the latter part of the twelfth century, and mentioned by

Fitzstephen, identical with the white Cambrian breed? These are questions more easily asked than solved. One thing is certain—the wild cattle of Chillingham will breed with the domestic race, but the progeny has never been preserved, the calves having been always killed at an early age, from a pardonable desire to keep this ancient race in all its purity; we firmly believe, however, that the cross-breed would be as fertile as any of our domestic varieties.

The author of the article Bos in the 'British Cyclopædia' is of opinion that the white cattle in question are domesticated oxen which have run wild, and moreover that they are not descended from an aboriginal stock, but that the race was originally imported by the ecclesiastics from Italy, where herds of wild cattle much resembling them still exist. In this, as in all other theories, authenticated facts as our basis are wanting.

The Chillingham wild cattle are invariably of a creamy white colour, with a black muzzle; the whole of the inside of the ears, and the tip externally, are red; the horns are white, with black tips, very fine and bent upwards. Some of the bulls have a thin upright mane, an inch and a half or two inches long. (Fig. 147.)

The weight of the oxen is from thirty-five to forty-five stone the four quarters (fourteen pounds to the stone); that of the cows, from twenty-five to thirty-five stone. The beef is finely marbled and of excellent flavour.

These cattle are fleet and active: "At the first appearance of any person they set of in full gallop, and at the distance of about two hundred yards make a wheel round and come boldly up again, tossing their heads in a menacing manner; on a sudden they make a full stop at the distance of forty or fifty yards, looking wildly at the object of their surprise; but upon the least motion being made they all again turn round and fly off with equal speed, but not to the same distance, forming a shorter circle; and, again returning with a bolder and more threatening aspect than before, they approach much nearer, probably within thirty yards, when they

147.—Chillingham Bull.

again make another stand, and then fly off: this they do several times, shortening their distance and advancing nearer and nearer till they come within such a short distance that most people think it proper to leave them, not choosing to provoke them further."

The females hide their calves for a week or ten days after birth in some sequestered situation, and visit them two or three times a day. If any person approach the calves, they crouch close, like a hare in form, and endeavour to hide themselves, but when roused exhibit great fury, pawing, bellowing, and butting at the intruder; the females are resolute in the defence of their young, and attack persons discovered near their lair with impetuous ferocity. Formerly the hunting of these animals was conducted with great parade, many scores

assembling on horseback, and hundreds on foot, to witness the sport; but from the number of accidents that happened, and perhaps from the disturbance created among the game, this practice has been long discontinued. The keeper now uses a rifle, and steals upon the animal selected, until within range, and drops it at a single shot.

English Domestic Cattle (*Bos taurus*).

To describe the form, contour, and colour of the domestic ox is superfluous; and all know that within the precincts of our fertile island, affording unequalled pasturage, the animal has ramified into many breeds, which it has been the care of the farmer to improve and modify to his own advantage. Excepting in a few districts, the ox is not employed in our country as a beast of draught, or for the labour of the plough, which it was in ancient times on the Continent, and still is in many countries; on the contrary, it is for its flesh on the one hand, and its milk on the other, that this animal is so valuable; indeed, everywhere the true importance of the ox is in itself, and not its labour, though in many parts of the world it is used both as a beast of burden and draught. Restricting our present observations to British cattle, we may observe that there are two parties immediately, and we may say professionally, interested in the culture of cattle—the grazier and the dairy-farmer; and both require different and, to a certain degree, incompatible excellences. With the grazier, roundness of form, a moderate smallness of bone, depth of chest, and an aptitude to acquire external fat upon a small consumption of food, are among the points of excellence aimed at and expected. On the contrary, the supply of a large quantity of rich milk is the desideratum of the dairy-farmer; and it very seldom happens that the qualities prized by the one party are combined with those required by the other: both therefore attend to their exclusive interests, agreeing only in the care bestowed upon the animals subservient to their respective

purposes. To note every variety and enter into minutiæ —the part rather of the farmer than the naturalist—is far from being our object; a sketch however of some of the principal breeds will not be uninteresting as an accompaniment to the pictorial specimens before us.

Among the older breeds was a long-horned race, now greatly modified, of which Lancashire and the West Riding of Yorkshire might be considered as the central district; whence it extended, not to the exclusion of other races, through the midland counties, and even into Ireland. This breed was termed the Craven, from a district of that name in Yorkshire, bordering upon Lancashire, where it is said to have originally appeared. This breed was large, coarse boned, and apt to be long in the body, which besides was destitute of roundness. The milk, if not abundant in quantity, was extremely rich, and suited the purpose of the dairy-farmer. The horns were of enormous length; sometimes they projected horizontally on each side of the head; generally however they swept downwards, with an inward flexure, often reaching below the level of the muzzle, or even meeting before it, so as to interfere with the facility of grazing: we have indeed often seen the points press against the sides of the muzzle, rendering it necessary to shorten them. In the beginning of the eighteenth century various agriculturists commenced a series of attempts towards the improvement of this old breed, which resulted in the establishment of the Dishley or new Leicester long-horn. To the grazier the improvement was most immediately beneficial, but the dairyman preferred the old stock. In process of time however the new breed extended, improving the cattle of the middle and northern counties, and especially of Ireland.

In its turn however this breed has almost everywhere yielded to a middle or short-horned race, and even in Leicestershire, the stronghold of the Dishley breed, few are now to be seen. In Cheshire also—which till recently retained a long-horned breed derived chiefly from the old Lancashire and new Dishley stocks—the Durham or short-horned race has made decided inroads, but with

doubtful advantage as respects the quality of the cheese for which that county is celebrated.

Among the long-horned race must be reckoned the old Shropshire breed, a large-boned and hardy race, well fitted to serve the dairy. It would appear that this breed is seldom to be seen pure, having been crossed with advantage by the short-horned Holderness. In Staffordshire the old long-horned breed has been in most parts superseded by short-horned cattle; it still however maintains its ground in the north of that county, more particularly along the banks of the Trent, and the Dove, close to the borders of Derbyshire. Between the long-horned and the short-horned races of our cattle intervenes a race termed "middle-horns," represented by the North Devonshire, Somersetshire, Herefordshire, Gloucestershire, and Sussex cattle.

The Devonshire breed is of great antiquity, and has been long celebrated for beauty; like most of our other breeds it has become improved during the last fifty or sixty years, and has perhaps now attained to its perfection. The head of the Devon ox is small, but broad across the forehead and narrow at the muzzle; the horns curve gracefully upwards, the chest is deep, and the back straight. The cow is small compared with the bull.

The system of ploughing with oxen is very generally practised in Devonshire, and where the land is not too heavy, no teams of oxen are superior, if equal, to these in this kind of work. It is however to the grazier that this breed is more especially valuable, few oxen rivalling the Devonshire in disposition to fatten and in the quality of the flesh. Generally speaking this breed is inferior to many others for the dairy, not indeed as respects the quality of the milk—for it yields a more than average proportion of cream and butter—but the quantity. Some farmers however have found the North Devons to yield even a large produce of milk, so that in this particular much may depend on choice of pasturage.

In Somersetshire the Devon breed prevails, or at least the original breed has been greatly crossed by the Devon, of which it presents most of the excellences.

The Somersetshire cattle are alike valuable for "the pail, the plough, and grazing." The tract of country between Bridgewater and Cross produces cheese of well-known excellence; the best Cheddar cheese is made either in that tract or the marshes round Glastonbury.

The Hereford improved breed, with white faces, is valuable as fattening rapidly, and that on inferior fare; the flesh is fine-grained, and highly prized in the market: the cows however yield but a scanty portion of milk. In Gloucestershire the Herefords are preferred for the team, and by graziers for fattening; but the old Gloucester breed for milk. This old breed is of mixed origin, consisting of a race of Welsh descent, as is supposed, crossed by various others, and among them the Alderney. The rich Vale of Berkley produces the finest Gloucester cheese.

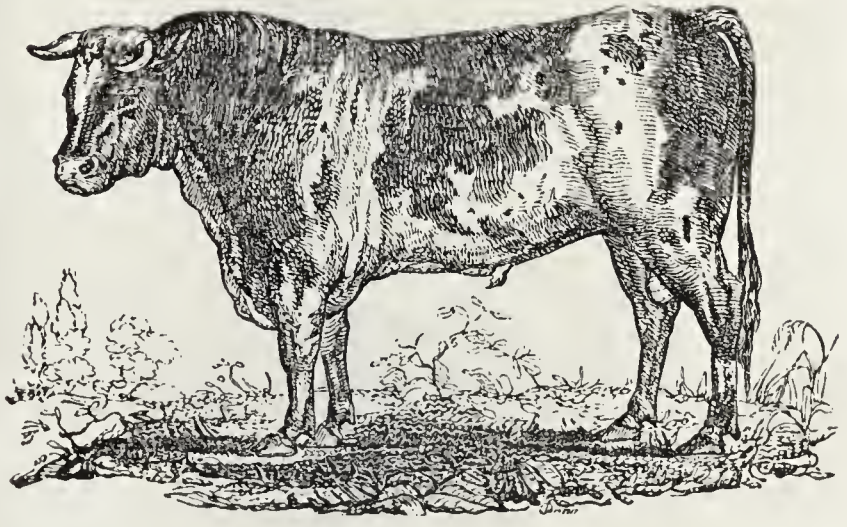
The breed of cattle in Sussex closely resembles that of Devonshire: according to judges it is intermediate between the Devon and Hereford, "having the activity of the first, the strength of the second, and the propensity to fatten and the beautiful fine-grained flesh of both." Its colour is deep chestnut red, or blood-bay, and a deviation from these colours indicates a cross. In the Weald of Sussex oxen of this valuable stock are generally used for team-work; and so great is their strength and quickness, that many teams have been known to travel with heavy loads fifteen miles a-day, for several successive weeks, and that without distress. The Sussex cow, as is the case with the Devon and Hereford, is very inferior in size to the bull; and though the milk yielded is good, it is of trifling quantity.

A valuable breed of middle-horned cattle extends through South Wales, and of this the Glamorganshire variety is highly celebrated. The oxen are readily fattened, and the cows yield a fair quantity of milk. (Fig. 148.)

The most extensively diffused breed of cattle on our island, and by far the most valuable, is that termed, by way of distinction, the short-horned, presenting every point in the highest excellency.

Of this breed England may justly be proud; in it is united as far as possible every good quality. The form is admirable; the oxen fatten quickly, and often attain to an enormous weight, and the cows are excellent as milkers.

It would appear that Durham and some parts of Yorkshire had long possessed a breed of short-horned cattle of large size, and celebrated for the quantity of milk yielded by the cows; but this breed, not only in figure, but in aptitude to fatten and in the quality of the flesh,



148.—English Bull.

required great improvement, other races far excelling it in these points, so important to the grazier. This stock still lingers, and is certainly valuable to the dairy-farmer, who might however substitute the improved breed for it with advantage. It is about eighty years since the improved stock of this old but really fine breed began to be established on the banks of the Tees, owing to the judgment and care of the intelligent breeders of that district. It differs from the old short-horns in possessing a well-developed figure, and in aptitude to acquire fat. The first step of improvement, resulting from the practical knowledge of Mr. Milbank and other

coadjutors, opened the way for the successful exertions of subsequent spirited breeders, who, by pursuing a judicious plan in crossing, have brought the breed to the highest pitch of perfection. Among these crosses it is supposed that the white wild breed has contributed a share, and to this circumstance is attributed the prevalence of white as characteristic of the stock.

Among the most successful of improvers was Mr. C. Colling, who bred the celebrated Durham ox exhibited in the years 1801-5-6, the produce of one of the ordinary short-horned cows and a bull termed Favourite, of noble figure. At five years old, says the excellent author of the work on cattle, "the Durham ox was sold to Mr. Bulmer, of Harmley, near Bedale, for public exhibition, at the price of 140*l*. This was in February, 1801. He was at that time computed to weigh one hundred and sixty-eight stone of fourteen pounds; his live weight being two hundred and sixteen stone: this extraordinary weight did not arise from his superior size, but from the excessive ripeness of all his points." The Durham ox in a short time passed into the possession of Mr. J. Day, who travelled with him through the principal parts of England and Scotland, till at Oxford, the 19th of February, 1807, he dislocated his hip-bone, and continued in that state till the 15th of April, when he was obliged to be slaughtered, and, notwithstanding he must have lost considerably during these eight weeks of illness, his carcase weighed, the four quarters one hundred and sixty-five stone twelve pounds, tallow eleven stone two pounds, and hide ten stone two pounds.

Among the most remarkable of Mr. Colling's experiments in breeding was that of a cross between the improved short-horns and a polled Galloway cow, which, being interbred with the pure short-horned stock, gave origin to a breed called the *Alloy*, a term at first given by way of disparagement, but continued afterwards when the excellences of the breed were acknowledged. Some idea of its value may be formed from the fact, that at a sale of Mr. Colling's cattle forty-eight animals (cows, bulls, year-old bull-calves, and heifer-calves)

realized 7115*l.* 17*s.* One bull named Comet sold for a thousand guineas.

Of the Alloy breed was the stock, or part of the stock, of the late Rev. H. Berry; the figure of the cows was excellent in every respect, and their milking quality is stated to have been by no means of low degree.

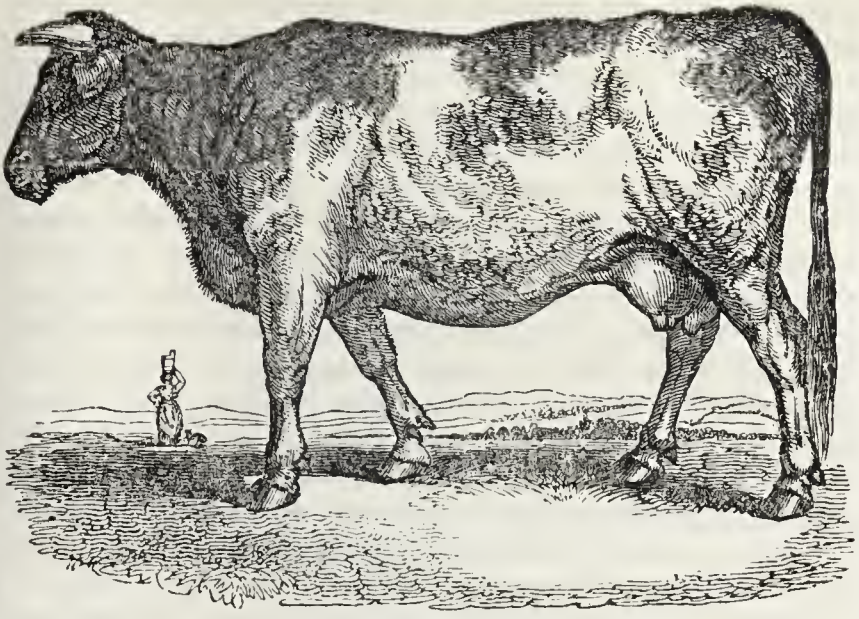
Among the most celebrated of the short-horned stocks of the present day, that in the possession of Lord Althorp, the late Earl Spencer, was one of the most distinguished. It was originally derived from the stock of Mr. R. Colling, and no pains have been spared in bringing it to the highest excellence. A celebrated bull, belonging to this nobleman, and which was known under the cognomen of Firby, may be regarded as a model of the breed. It is a peculiarity in this short-horned race, that the cows are excellent as milkers, and moreover that when dried they fatten rapidly. The oxen, as it is acknowledged, are fit for the butcher at the age of two years; but this tendency to acquire fat renders them indolent workers, and more unfitted for the team than other breeds; a circumstance of little consequence, as cattle which are profitable to the breeder at two years old, and are as ready for the butcher at this age as those of any other breed at three or even four, ought never to be submitted to the yoke. The bulls, indeed, being extremely docile, may be employed with advantage in many operations going on in every farm, a plan the more advisable as they are apt to acquire too much fat, which moderate labour would tend to diminish.

It must not be supposed that every breed of short-horned cattle is endowed with the qualities characteristic of the improved stock, which render it so valuable. There is, for example, a breed of short-horned cattle in Lincolnshire, with which the Smithfield market is abundantly supplied; but the cattle of this stock are by no means first-rate animals. The head is finely modelled, the bone is comparatively large, the limbs high, and the hips wide. In many instances the stock has been improved by admixture with more highly-bred animals, and rendered valuable, but the flesh is not fine-

grained. On the whole these cattle are better adapted for the dairy-farmer than the grazier, as the cows yield a fair quantity of milk.

Among the short-horned race must be enumerated that singular breed of cattle called Alderneys, which has gained, and deserves, a degree of celebrity from the peculiar richness of the milk afforded by the cows. These cattle are originally from Normandy and the islands on the French coast, from one of which (Alderney) they take their name. They are small in size, awkwardly shaped, with a peculiar bend in the back, and in every point more or less defective. The milk yielded is not great in quantity, but abounds with butter; and it is from its richness that these animals are favourites. Improbable as it might seem from the appearance of the Alderney, its aptitude to fatten is remarkable; even the cows, when dried, soon gain flesh, and acquire considerable weight. It is chiefly in pleasure-grounds and the paddocks attached to the houses of persons not engaged in farming for profit that cows of this breed are to be seen. In Hampshire alone the Alderney breed is general, constituting the stock of the farmer. It would appear that it is more suited to the pasturage of that county than others which require richer grazing-grounds, consume a large quantity of food, and return a disproportionate supply of milk.

Our cut (Fig. 149) represents the Yorkshire cow. With respect to other breeds of which we have as yet said nothing, we may observe that in the Highlands of Scotland a race of small black cattle prevails, of which large herds are driven southwards, and depastured in the grazing-lands of England. Of these numbers are brought to the London market. Of this race many varieties exist. Of these we may particularize the Kyloes of the Western Islands and the Hebrides: they are small, but hardy and well-formed, thriving on coarse fare, and producing fine-grained and high-flavoured meat. The different islands of the Hebrides contain, says Mr. Youatt, "about one hundred and fifty thousand of these cattle, of which it is calculated that one-fifth are annually



149.—Yorkshire Cow.

sent to the mainland, principally through Jura, or across the ferry of the isle of Skye. If these average about 5*l.* per head, the amount will be 150,000*l.*, or more than the rental of the whole islands, which Mr. Macdonald calculated at 106,720*l.*, but which now produce a greater sum. Cattle therefore constitute the staple commodity of the Hebrides. Three thousand five hundred are annually exported from the island of Islay alone."

In the north of Argyleshire the cattle are larger than those of the Hebrides, and are bred to the full size which the pasturage will admit and the good qualities of the animal bear without deterioration. It is in this district that the most perfect Highland cattle are oftenest seen. The animals are compactly built, short, and rather strong in the shank, straight in the back, with a fine muzzle and small sharp horns. As they wander over a wild country, they are wild and often fierce, and their eye expresses energy and spirit. It is solely for their flesh that herds of these cattle are reared: "Every effort," says Mr. Youatt, "to qualify them for the dairy

will not only lessen their hardiness of constitution and propensity to fatten, but will fail in rendering them valuable for the purpose at which the farmer foolishly aims." In the stewartry of Kirkeudbright, together with part of Ayrshire and Dumfries, forming the old province of Galloway, a beautiful polled or hornless breed of cattle exists, highly esteemed for their many excellences. In figure they are admirable, excepting that the neck of the bull is almost too thick; but the chest is deep, the limbs clean and short, the back straight, and the body round. Black is the prevailing colour. These cattle exceed the Argyle breed in size; they fatten well and quickly, and their flesh is excellent: "Few cattle sell so high in the Smithfield market, and it is no uncommon thing to see one of these little bullocks outsell a coarse Lincolnshire bullock, although the latter is heavier by several stone."

The Galloway cattle are remarkable for gentleness; and robust and muscular as the bulls are, one of mischievous habits and bad temper is seldom met with. Ayrshire, Aberdeenshire, Perthshire, and other districts have their peculiar breeds. In Wales several breeds of cattle are found; in the isle of Anglesey there is a fine race of middle-horned black cattle, with a deep chest, heavy shoulders, enormous dewlap, and round body. The appearance of the bulls of this breed is very noble and imposing; the expression of the head is animated, bold, and even fierce; and this character is not lost altogether in the oxen and cows. It is calculated that upwards of ten thousand are annually exported from this island. The flesh of these cattle is of first-rate quality. The numerous inferior crosses or mongrel breeds of doubtful origin, into which the cattle of our island have ramified, need no especial notice.

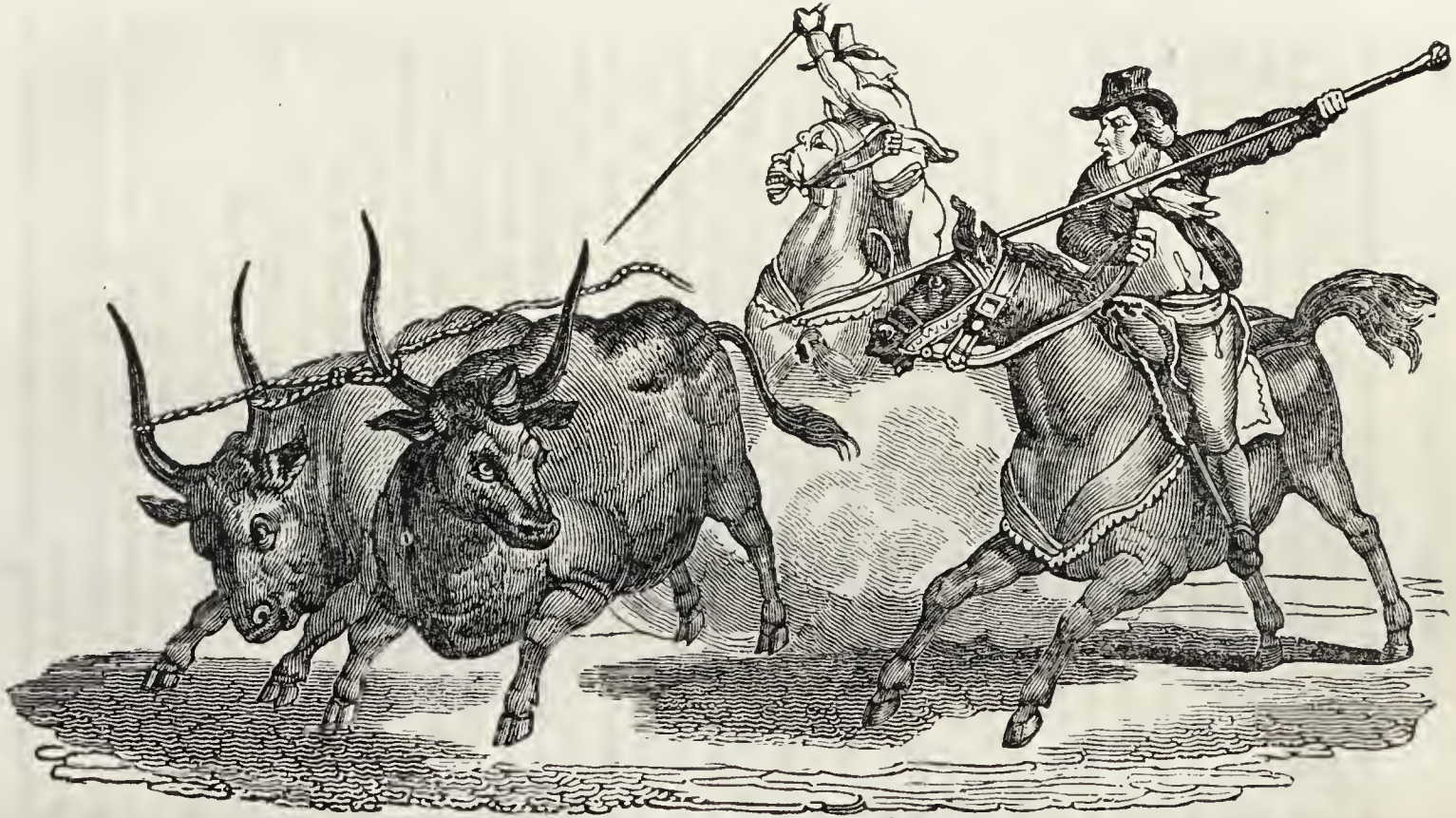
The annual Exhibition, by the Smithfield Cattle Club, is interesting not only to those immediately engaged in agricultural pursuits, but to every one who reflects upon the importance of the ox in a commercial sense independently of every other consideration. Here are to be seen the results of exertions, principally carried

on during the last eighty years, to unite and bring to perfection the most desirable points in the various breeds of domestic animals which were once peculiar to different parts of Great Britain, but are now spread in their improved form over every part of the country. In the gallery, a portion of which overlooks the show-yard, are to be seen agricultural implements and machinery of the latest and most improved construction; roots and plants adapted to our climate, but which are as yet comparatively unknown; specimens of artificial manures, and of the soils of districts differing from each other in their geological formation. In spite of all the advances which agriculture has made during the present century, how slowly do improvements extend beyond the intelligent circle in which they are first adopted! and it is one of the great advantages of institutions such as the Smithfield Club to spread them more rapidly and widely by drawing the agriculturist from the secluded scenes in which he carries on his occupations, and bringing them before him in the manner best calculated to demonstrate their utility.

A prize ox or sheep is fatter than the ordinary market requires, and hence it is often supposed that the stimulus of prizes for bringing an animal into a state of unnecessary fatness is altogether a work of supererogation. But the power of reaching an excessive size is simply a test. A piece of artillery is tried by a charge greater than is ever required in ordinary practice; and an ox is fattened for exhibition beyond a useful marketable condition, simply to show the capacity of the breed for acquiring, at the least expense of food, and at the earliest age, such a condition as the public demand really renders necessary.

We must now leave the subject of British cattle, and comment upon various species from other portions of the globe.

Figs. 150 and 151.—These delineations present us with an uncouth, savage, half-wild breed of cattle, spread through the Maremma of Italy. The Maremma is a flat strip of country, except in a few places where hills intervene, extending from the mountains of Genoa to the



150.—Driving Wild Cattle in the Maremma.

extremity of Calabria, a length of about seven hundred miles. Its breadth is from the base of the lower range of the Apennine chain to the shore of the Mediterranean. This sweep of country is pestilential in the extreme in summer, and, though it yields the most luxuriant harvests, is only partially brought into cultivation, the greater portion being left for pasture. Here, besides the cattle used as beasts of burden or draught, and employed in the work of the farms, large herds roam unmolested under the care of keepers, which, together with the buffalo-keepers and forest-rangers, are the only stationary population in the wild Maremma. The former, as wild and savage as the animals under their charge, are always mounted on fleet horses, and armed with a long lance, which they use in driving the cattle, and in defending themselves against the fierce bulls, which, as well as the buffaloes, are extremely dangerous. These men are often criminals, who have fled from justice into the Maremma, where they are obliged to sojourn, and are often employed by the proprietors of the farms and cattle, as rangers or drivers. Those who are not fugitives adopt their occupation from choice, which, dangerous and laborious as it is, is one of independence and freedom; they are the analogues of the Arab of the desert, or the Gauchos of the Pampas. Besides being paid for their services, they rear cattle of their own, which they are allowed to feed with the rest. In the summer months they retire to the shady forests along the sea-shore, where the air is not so unwholesome as in the open plains. The cattle are collected at various times, and driven by these men, called vaccari, to the fairs held in the towns, for sale. Both the bull and the buffalo are baited in Italy, by men and dogs, for the entertainment of the Roman people, who seem to be as fond of circenses as were their great predecessors. The scene of the sport, which is called La Giostra, is, like many other buildings in Rome, a curious compound of the modern and ancient. The Amfiteatro Correa, as the place is designated, is situated in the massive cluster of buildings raised upon the site, and partly with the materials, of the mausoleum

151.—Driving Wild Cattle.

of the emperor Augustus in the Campus Martius. The walls of this amphitheatre and the seats are all of modern structure. The arena occupies the platform of the ancient mausoleum, which in other times was cultivated with flowers and rare shrubs, while the pyramid that bore the statue of Octavius rose in the midst. The vaults beneath, which once held the ashes of the Cæsars, are now in part used as dens for the wild cattle that are brought in from the Campagna and other places to be baited. Twice every week during the summer do these exhibitions take place: they begin at five in the evening, and last till dusk.

The men who are to encounter the bulls and buffaloes

are called Giostratori. They are dressed in white, with a red sash round the waist; each bears a short staff with a red pennon at the end of it: they muster in the arena, make their bows to the assembled spectators, and wait the onset of the mighty animal. Among them are generally two or three of great reputation for skill; these are usually vaccari (herdsmen), or buffalari (buffalo-keepers), men brought up from their childhood among the cattle they respectively manage, and familiarized with their habits. The Giostratori from Viterbo have the reputation of excelling all others, and hence the term Il Viterbese (the Viterbonian) is used metonymically to designate any celebrated bull-fighter. In the centre of the arena is a strong post firmly fixed, by dodging round which a man may for a considerable time evade the assaults of a bull or buffalo. At a given signal the door of a den is opened, and the bull rushes forth, wildly gazing around him, till, observing the Giostratori, with their scarlet sashes and pennons, he singles out one, and roaring and lashing his tail drives furiously towards him. The man nimbly avoids the charge, others come to the rescue, drawing off the bull's attention from him, and inviting his attack; till the enraged animal, distracted by the number, quickness, and manœuvres of his antagonists, and wearied with vain efforts, ceases the pursuit. The den is then thrown open, and he generally retires of his own accord, as if glad to escape. When the bull, as is sometimes the case, perseveringly follows a man, and presses him hard, he catches hold of one of the iron rings placed at certain distances round the wall enclosing the arena, and by a rapid movement springs to the top, which like a terrace runs round the foot of the lower seats of the amphitheatre. The height of this parapet is six or seven feet, and it requires great agility, strength, and presence of mind, as well as precision, to avoid being pinned to the wall in the act of taking the leap; such accidents sometimes happen, but when the Giostratori see one of their number thus endangered they use every means to divert the bull's attention.

152.—Bull of the Campagna of Rome.

The bull (and also the buffalo) is on some occasions baited with fierce dogs of the Corsican breed, resembling our bulldog, and distinguished by the same "tenacity of tooth" and indomitable courage. They usually pin the bull by the nose or lip, but are very frequently tossed in the air, or ripped up, by the sharp horns of the maddened animal. At these exhibitions, strange to say, females are among the spectators, and not less interested than the rougher sex.

Some of the bulls procured in the Campagna of Rome are very noble and spirited animals, of fine figure and great strength.

Fig. 152 represents a bull of the Campagna of Rome.

In Spain and Portugal, where extensive wilds and forest-lands afford ample pasturage, large herds of oxen, born in freedom, wander uncontrolled and untroubled, excepting by man, from whom they flee with precipita-

tion, till roused to fury by his assaults, when they attack in turn, and bear upon him with resistless impetuosity. It is from these herds that the Spaniards and Portuguese select the fiercest and boldest for the revolting contests of the arena; while others are tamed, and broken in for the ordinary purposes of husbandry.

We may easily imagine the excitement produced by the chace and capture of a herd of these fierce animals, and the danger to man and horse.

The chace is thus described in the 'Penny Magazine' by an eye-witness who was engaged in it:—

"The Spanish bull-fight has been often described, but that species of bull-fight which, while it affords pastime to the people, subdues the noble animal to be a partaker of the labours of the husbandman, is, we believe, little or not at all known in this country. The peninsula abounds with extensive forest-lands, which, though reaching over a wide extent of country, are sufficiently open to afford pasture and food to herds of wild cattle who roam almost unmolested amongst their shades. The great forest of the Alemtejo is an apt illustration. In this some hundreds of square miles of country are occupied by growing timber; but within its bounds large open spaces exist which serve for pasturages, and occcasionally a farm, a vineyard, or an olive-grove may be seen, struggling as it were for existence amidst the vast solitudes. But though occasional glimpses of culture appear, they are far too few and far between to offer any serious check to the increase and independence of the herds which roam around them undisturbed. It was in this forest that I witnessed for the first time the method of capturing the wild bulls. I had received intimation that the village of Alcoxete, on the Tagus, was to be the scene of a bull-fight, and that the villagers for many miles round were invited to join in the hunt, which was to take place on the following day. I accordingly crossed the river in company of about twenty persons, mostly military, each being provided with a long pole, having a small spike fixed in one end, and mounted as inclination or ability suited. When we arrived on the

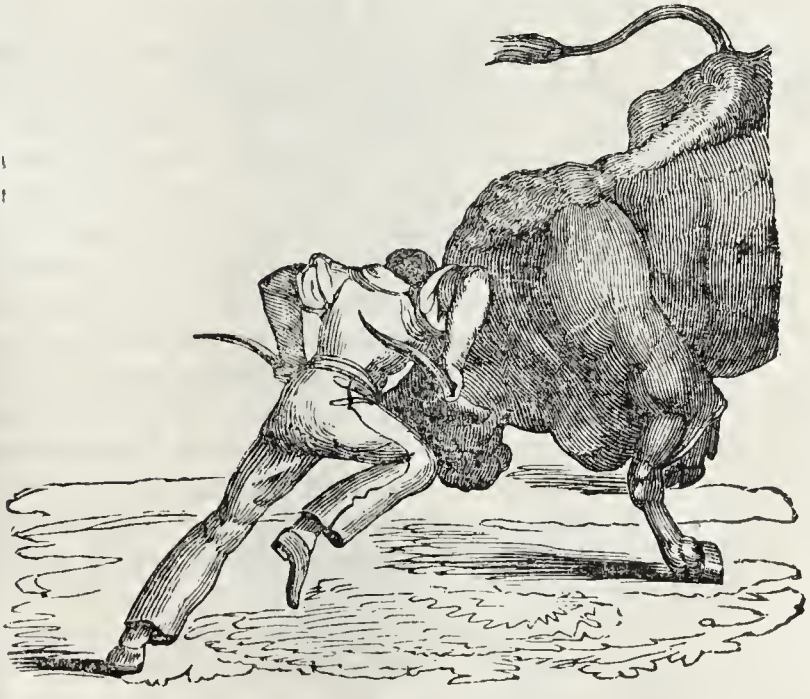
opposite bank, a little before daybreak, we found about 250 or 300 persons assembled, some mounted on different sorts of quadrupeds, from the noble Andalusian horse to the humble hack donkey, and very many on foot. They were all armed in a similar manner to ourselves. As soon as daylight began to appear we all marched off towards the forest. The morning was peculiarly fine, and the interest of the beautiful scenery was heightened by the varied costumes of the persons by whom we were surrounded. As soon as we had advanced some distance into the wood we halted for the purpose of refreshment, before the arduous and somewhat perilous duties of the day began. After a hasty meal we divided into two parties, one stretching in a long line to the right and the other to the left. We had not advanced far in this manner before we fell in with a herd of cattle having twelve bulls with it, which no sooner descried us than they bounded off with the speed of lightning. The sport had now begun; we put our horses to the utmost speed, threading our way amongst the tall pine-trees as well as we could, and endeavouring by wild cries to drive the bulls towards the other party. At length, after about an hour's chace, some half-dozen of us who were better mounted than the rest came up with them, and commenced the attack with our long poles. The manner was this:—One person riding at full speed gave the bull nearest him a sharp prick with the goad, which it no sooner felt than it turned upon its assailant and gave chace; another horseman then coming up attacked it on the other side, when, leaving the first assailant, it turned upon the second; he in like manner was rescued by a third, and so on. The attention of the infuriated animal thus distracted prevented his escape, and gave time for the other hunters to come up. The bulls were thus at length separated from the herd. A sufficient number having arrived to form a circle round them, we commenced operations for the purpose of driving them towards the town: all the skill of the riders was now necessary, and all the activity possessed by both man and horse, to keep clear from the pointed horns which

on every side were directed against him, as well as to prevent the herd from breaking through the living net with which it was surrounded. This was perhaps the most difficult part, and was attained by keeping each bull separately engaged, and thus preventing united action; for what line was sufficient, armed as we were, to resist the simultaneous rush of these most powerful animals? The continued activity and exertion requisite had knocked up many of the poor jades who had started in the morning, and the circle became smaller and smaller as the day advanced; several, too, had been carried off severely gored and wounded by the horns and feet of the bulls. I however, and the party with whom I started, were resolved to see the conclusion, and, redoubling our efforts, we at length, about four o'clock in the afternoon, succeeded in driving them into an enclosure where were a number of oxen (all at one time wild) with bells, quietly grazing. Here they were kept till required for the next day's sport.

"The square of Alcoxete has been fitted up in the form of an arena, with seats, or rather standing-places, all round; the centre was carefully cleaned, all stones removed, and fresh sand strewed. At one side a cart was stationed for a purpose to be presently described; at the other a pen was fitted up for the reception of each bull as it was to make its appearance, communicating by a door with the place where the herd was enclosed. The difficulty of bringing the bulls from their temporary resting-place to the scene of their humiliation was not less than that of their original capture. Through the forest they had only the trees and shrubs before them, to which they were accustomed; and, if the line of huntsmen alone was sufficient to awaken their rage and terror amidst scenes familiar to them, how much more must those feelings have been excited when passing through the streets of a town crowded with people, the houses gaily decorated with red, blue, white, and green hangings, and greeted with a thousand tongues in the joyfulness of expectation! Twice the terrified and furious herd turned and dashed through the assembled

crowd, tossing and goring all who ventured to oppose them, and twice the circling horsemen brought them back. One fine black bull took to the river and swam out about two miles before a boat could be put off to recapture it. Several of the English soldiers who were quartered near the town swam after it, and one of them, an excellent swimmer, had nearly reached it, when a fishing-boat came up, and, fixing a cord round the bull's horns, towed it in. The soldier, however, was resolved not to have his trouble for nothing, and, mounting on its back, was landed safely amidst the shouts of the spectators. The sport of baiting the bulls for the purpose of taming them began at three in the afternoon, when the heat of the sun had somewhat abated. Six of the wild animals were ushered into the circus, surrounded by a band of mounted picadores, and accompanied by several tame cattle with bells, when one by one they were secured with cords to the cart, and a leathern cap placed on the points of the horns, after which they were all driven into the pen. The circus was then cleared, and the Spaniards entered, gaily attired in the Andalusian costume, the grace and elegance of which must be seen to be properly understood. The hair, which is worn long, is confined in a black silk bag, which is fastened with bows of black riband: the light-coloured velvet jacket, covered with gold lace and silver-gilt buttons, the velvet vest richly embroidered, the lace shirt, red silk sash, velvet breeches, and silk stockings, all harmonising in colour and form, set off the figure to the best advantage and add to the grace and elegance for which the Andalusian is so justly celebrated. These men, of whom there were five or six, are accustomed from their infancy to the dangerous employment of bull-fighting, and the agility and dexterity displayed in evading the furious attacks of the bull are astonishing. After carefully examining the arena they each armed themselves with four short barbed darts, and waited for the coming of the bull: they had not to wait long; the door was thrown open and the animal rushed into the centre, greeted by the shouts and vivas of the spectators.

One of the Spaniards, advancing, invited the attack, when the bull, who at first, bewildered and amazed, had stood tearing up the earth with its feet till almost hid from view by the cloud of dust, lashing itself into fury with its tail, rushed upon its opponent. All who were not accustomed to such spectacles thought the man must inevitably have perished; but just as the long and powerful horns seemed to touch his body he stepped nimbly aside, and, turning smartly round, planted all four darts in the animal's neck just behind the horns. Loud shouts of applause rewarded his dexterity, and the bull, more enraged than ever, ran round the area tearing up the earth and bellowing with rage, until encountered by a second picadore with like success. After the Spaniards had exhausted themselves in exciting the rage of the bull, they quitted the area, and the populace were admitted to throw the bull: this was generally done by one man leaping between the horns, upon which



153 —Bull-fight.

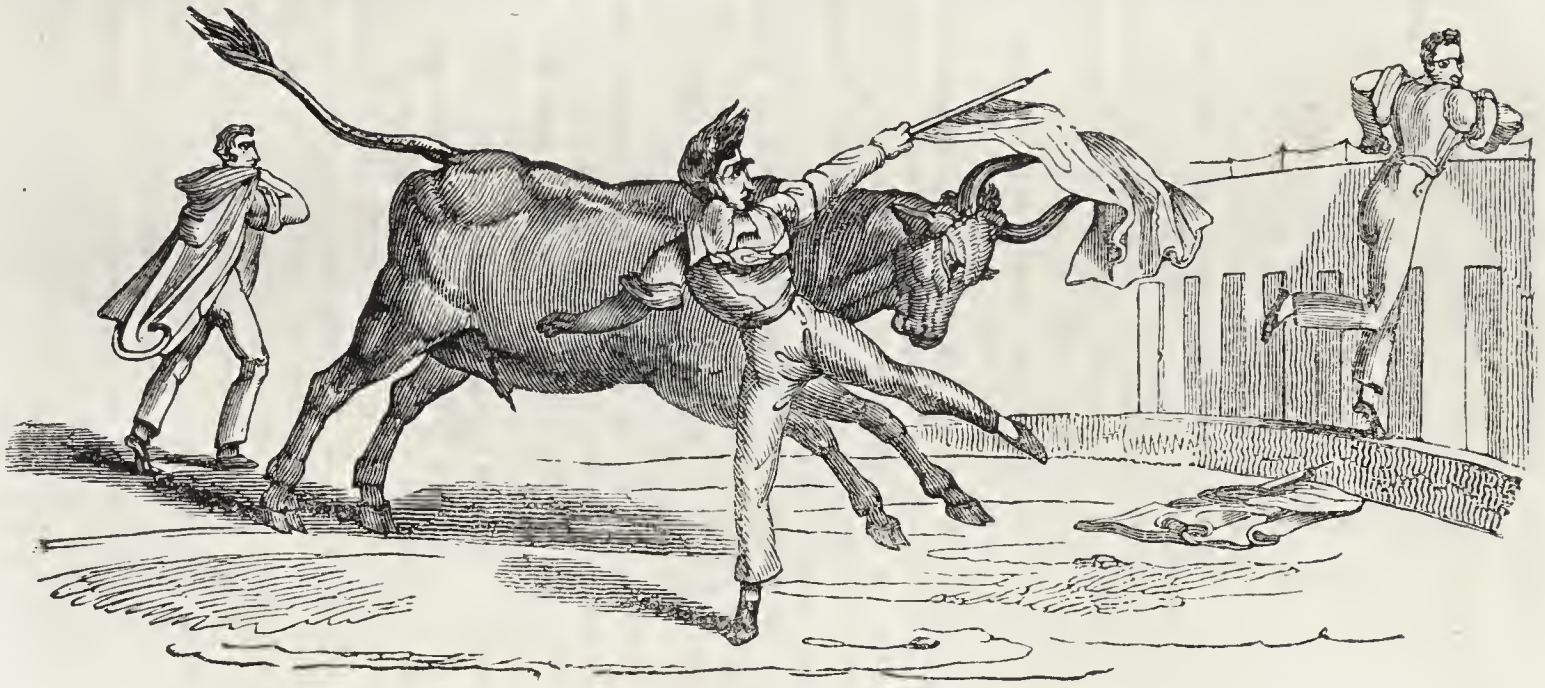
he supported himself in an upright posture till relieved by his companions, who threw the bull to the ground. (Fig. 153.) The cry of 'largo, largo,' was the signal for its liberation, when, some tame cattle being admitted, it was led by them to the pen. Six bulls were thus baited the first day, the other six on the day following. Three weeks afterwards I had these very animals under my charge as baggage-oxen, as tame and gentle oxen as could be desired."

The bull-fights as conducted in the amphitheatres of Spain and Portugal, the lingering relics of those contests in which Rome so much delighted, and which prevailed more or less throughout the Roman empire, have been often described. These sanguinary spectacles are the delight of the Spanish people, and are not only tolerated, but encouraged, by the higher classes of both sexes, who find great satisfaction in the torments which the bull endures from the lance of the cavalier, or the horse from the horns of the bull.

The most graphic and spirited description of this "ungentle sport" is that by Lord Byron, in 'Childe Harold's Pilgrimage,' canto i., which we forbear to quote, feeling assured that all are familiar with it. In a note by Sir J. C. Hobhouse the following additional particulars are recorded:—"The magistrate presides, and, after the horsemen and picadores have fought the bull, the matadore steps forward and bows to him for permission to kill the animal. If the bull has done his duty by killing two or three horses, or a man, which last is rare, the people interfere with shouts, the ladies wave their handkerchiefs, and the animal is saved. The wounds and death of the horses are accompanied with the loudest acclamations and many gestures of delight, especially from the female portion of the audience, including those of the gentlest blood." Fig. 154, representing a bull-fight, shows the manner in which—

"the matadores around him play,
Shake the red cloak, and poise the ready brand,"

before dealing the fatal blow which severs the spinal chord at the back of the neck.



154.—Spanish-Bull-fight.

Of the effects of such exhibitions on the character of the people nothing need be said; whatever atrocities may be committed by men "nurtured in blood betimes" cannot surprise us.

Within the Arctic Circle the ox gives place to the rein-deer, but in Iceland cattle are reared in great numbers, and are valuable. In size and appearance, excepting that they are seldom horned, they resemble the breeds of the Scottish islands. It would appear that the Icelandish farmers conduct the breeding of their stock on no principles; consequently, there is great room for improvement; nevertheless, the cattle on the whole are handsome, and the cows yield a considerable quantity of milk. In Norway and Sweden cattle are numerous, and also in Russia: as is well known, the main exports from Russia to England are tallow and hides. In that extensive empire vast numbers are reared, principally in the southern provinces; and the markets of St. Petersburg and other towns are supplied by cattle sent from distant parts of the country. The herdsmen live in a state of barbaric simplicity, and are nomadic in their habits; they travel with their herds to Moscow, St. Petersburg, and other places, which depend more upon them for a supply than upon the farmers of the adjacent districts. The following passage in Johnston's 'Russia' conveys a good idea of the Russian cattle-keeper and his herd: —"Along the road," he says, "we passed one or two large droves of horned cattle proceeding to St. Petersburg. We learned that they were brought from the provinces south of Moscow. These cattle are all of a whitish colour, well made, and of about seven hundredweight. Their journey to St. Petersburg occupies three months; they travel from eight to sixteen miles during the night, and are allowed to pasture and rest during the day on the sides of the road. The herds are attended by one or two men, who convey their cooking utensils, baggage, &c., in a waggon drawn by two oxen; and while their numerous herds repose undisturbed under the shade of the delicate birch, they stretch themselves on the ground and pass their time in a true Scythian state. Here are

also seen a few sheep, but of an inferior breed, covered with hair somewhat like that of a goat. This country is not favourable for the pasture of sheep, owing to the coarseness of the grass and quantity of wood. Little or no attention seems to be used in the rearing of any other animal besides the horse: to him alone the Russ devotes his whole attention, and from him he derives his livelihood."

In Wallachia and Moldavia cattle are abundant; in the latter district, indeed, the people continue in a great measure their ancient nomadic habits, making use of the services of the ox as a beast of draught or burden; united in immense caravans, they roam over an immense extent of territory, transporting in tall vehicles of singular construction various articles of produce, provisions, and other things, to the towns scattered at wide distances about the vast plains of Moldavia. Day by day they move cheerfully on, to the slow and measured sound of the footsteps of their oxen, and are often an entire month without seeing a single human habitation. At the approach of evening the caravan halts, the numerous waggons are disposed in the form of a square, and the oxen are turned out to graze at large, under the watchful care of intrepid dogs who accompany the caravan. In the middle of the square a fire is now lighted, at which the conductor prepares his simple repast, and afterwards disposes himself for sleep, sheltered by a warm and heavy coverlid that completely enwraps him. These indefatigable walkers are no less excellent riders: they possess a fine race of horses, which are employed for drawing lighter vehicles, while the heavier waggons are drawn by the slow oxen. There are no high roads in Moldavia; the plain is open, and each traveller chooses his own track, and it is often with difficulty that the oxen can drag their way through heavy ground: storms of wind, rain, or snow make the matter worse, so that a passage can only be achieved by great patience, labour, and resolution. The sketch (Fig. 155) represents a bullock caravan of Moldavia wending its weary way over the vast plains of Moldavia, while lighter vehicles drawn by

155.—Bullock Caravan in Moldavia.

swift horses are seen in the distance. It is by these caravans that the trade and commerce of Moldavia are carried on, and the towns supplied with grain.

In Switzerland there is an excellent breed of cattle, and in no country are these animals more carefully attended to, or held in greater esteem for their utility, as far as the dairy is concerned. Travellers have frequently noticed their docility and intelligence, which they have at the same time not a little exaggerated. It is customary to hang bells round the neck of the cattle, sheep, and goats, in order that, if they stray among the hills and mountains, the herdsman may be directed by the sound in his pursuit of them, the slightest tinkle being heard at a great distance in those lofty and still regions. The cows selected to bear the bell become accustomed to it from habit, and often, we doubt not, betray signs of uneasiness when deprived of it, but the account given by some writers respecting their feelings borders on the ludicrous. "The cow, whose superior beauty, sagacity, or good conduct seems to calculate her for the leader of the herd, is always on gala days distinguished by the largest and finest toned bell, and the bravest ornamental collar, and so down through all the gradations of good, to the small appendage that marks the indifferently good or clever animal, and the total absence of ornament and distinction which points out the self-willed or vicious. If any cow has been guilty of straying, of unseemly behaviour, breach of discipline, or any vicious trick, the displeasure of the vacher is not testified by blows, but by the temporary deprivation of her bell, and this seldom fails to reduce her to order and prevent a repetition of the offence. It is only necessary to see the cow on a gala day, with her badge of distinction strapped round her neck, and then to see her deprived of it for some reason or other, to be convinced that this is true. She is now gay, good humoured, and frolicsome; then sulky and gloomy." (Latrobe's 'Alpenstock.')

The pastoral economy of Switzerland, which is common to Savoy and other alpine countries, and the annual progress of the shepherds and cowherds with their flocks

and cattle to and from the mountains, are interesting. The richer proprietors and breeders in the Alps possess tracts of pasturages, and sometimes houses, at different heights. In winter they live at the foot of the mountain in some sheltered valley, but this they quit in the spring, and ascend gradually, as the heat brings out vegetation, on the higher lands. In autumn they descend by the same gradations to the valley. Those who are less rich have a resource in certain common pastures, to which they send a number of cows proportionate to their means of keeping them during the winter. Eight days after the cows have been driven up to these common pastures, all their owners assemble, and the quantity of milk each cow produces is accurately weighed. This operation of weighing is repeated one day in the middle of summer, and again at the end of the season. The milk of all the cows has, in the meanwhile, been put together and made into butter and cheese, and this common product is divided into shares according to the quantity of milk each owner's cows yielded on the days of trial.

In some parts of Switzerland, and more particularly in the retired parts of the Forest cantons, the peasants make use of the Alp-horn for the purpose of collecting their herds. This primitive instrument is a tube of wood about five feet in length, of very simple construction : it produces a deep, mellow, and prolonged note, resounding to a great distance, floating over the upland pastures, and echoing from crag to crag and from rock to rock. On hearing the well-known summons, which is regularly given at sunset, the cattle bestir themselves, and wend their way to the châlet, where the peasants are waiting their arrival. The deep note of the Alp-horn heard among the imountains, and multiplied by echoes till the last tone dies away, produces a pleasing impression on the traveller, which he long remembers.

Waggons drawn by oxen, often cruelly overtasked, are the ordinary travelling vehicles of South Africa, and are admirably adapted for the country, which is rugged and mountainous, and generally destitute of any other roads than the rude tracks originally struck across the

wilderness by the first European adventurers. Each waggon is provided with a canvas tilt, to protect the traveller from sun and rain, and is drawn by a team of six, eight, or even twelve oxen, fastened with wooded frames to a strong central trace, or trek-tow, formed of twisted thongs of bullock's hide. The driver, who sits in front, has a whip of enormous length, which he often uses with unsparing severity.

Formerly, indeed, if the account given by Barrow is to be credited, the treatment exercised by the Dutch-African boors to their oxen was brutal in the extreme. The Dutch boors, moreover, made use of very large and clumsy waggons, and delighted in transporting tremendous loads at a time. It was a common sight to see six, eight, ten, or even a dozen pair of oxen yoked to an enormous vehicle. But even this number was inadequate to such burdens as they had to draw, and the resistance of such roads. The most disgraceful cruelties were used to force these poor creatures on their way. Their drivers cut them with knives, and when, worn out, they laid themselves down, and refused to rise, it was a common practice to light fires under their sides, and so force them to go. One of these brutal boors, whose knife had been often employed on the flesh of his cattle, boasted that he could start his team at full gallop by merely whetting that knife on the side of his waggon. Once, as he was exhibiting this experiment, the waggon was overturned, and one of the company, "unfortunately not the proprietor," says Mr. Barrow, "had his leg broken."

When the Dutch took possession of the Cape of Good Hope, they found the Hottentots a pastoral people, possessed of flocks and herds; the oxen were of large size, with the horns long and sweeping forwards and upwards, and they were not only trained for riding, but even as guardians of the flocks and cattle, and as instruments of destruction in battle. The Hottentots, says Kolben, who visited them while they yet retained their name and independence as a nation, "have oxen which they use with success in battle; they call them Bakeleys: every army is provided with a large troop of these war-

oxen, which permit themselves to be governed without trouble, and which their leader lets loose at the appointed moment. The instant they are set free they throw themselves with impetuosity on the opposing army; they strike with their horns, they kick with their heels, they overthrow, they rip up, and trample beneath their feet, with frightful ferocity, all that opposes them; they plunge with fury into the midst of the ranks, and thus prepare for their masters an easy victory. The manner in which these oxen are trained and disciplined certainly does great honour to the talent of these people."

Le Vaillant, who was in South Africa in 1781, saw some of these oxen, which were then, as he states, only used by certain tribes of Hottentots; but he gives the same account of their mode of fighting as Kolben, who also describes the Bakeleys as guardians of the flocks. "When out in the pasture-grounds, at the least sign of their conductors they will hasten to bring back the cattle which are straying at a distance, and keep them herded together; they rush on strangers with fury, whence they are of great service against the Boschmen, or robbers, who may attempt to plunder the flocks. Each kraal has at least half a dozen of these bakeleys, which are chosen from among the most spirited oxen; on the death of one, or when one in consequence of old age becomes unserviceable, in which case its owner kills it, another ox is selected from the herd to succeed it. The choice is referred to one of the old men of the kraal, who is thought to be most capable of discerning that which will most easily receive instruction. They associate this noviciate ox with one of long experience, and they teach him to follow his companion, either by beating or some other method. During the night they are tied together by the horns; and they are also thus kept tied during the greater part of the day, until the learner has become a good guardian of the flock. These guardians know all the inhabitants of the kraal, men, women, and children, and testify the same respect towards them that a dog displays towards all those that live in the house of his master. There is, therefore, no inhabitant of the

kraal who may not with safety approach the flocks; the bakeleys never do them the least injury; but if a stranger, and particularly a European, should offer to take the same liberty without being accompanied by some Hottentot, he would be in great danger from these guardians of the flock, which usually feed round it, and which would come upon him full gallop. Then, unless he be within hearing of the shepherds, or have fire-arms or good legs, or unless a tree be near in which to climb, he is sure to be killed: it would be useless for him to have recourse to sticks or stones; a bakeley has no fear of such feeble weapons."

Sparmann, who visited South Africa in 1775, was one of the last travellers who found the Hottentots in their original state of pastoral freedom; he mentions a woman who was possessed of sixty milch-cows, and that, on the cattle of the kraal being brought home from pasture, the evening was enlivened by singing and dancing.

The Caffres, Corannas, and other tribes have oxen in abundance, which are employed as beasts of burden. The Corannas are a nomade race, frequently removing with their flocks and herds to fresh pasture-lands: and transporting their mats, tents, and utensils strapped on the back of oxen, which also carry themselves and their wives and children:

"Fast by his wild resounding river
The listless Coran lingers ever;
Still drives his heifers forth to feed,
Sooth'd by the gorrah's humming reed;
A rover still uncheck'd will range,
As humour calls or seasons change,
His tent of mats and leathern gear
All packed upon the patient steer."

PRINGLE.

Burchell thus describes the saddle-oxen of South-Africa: —"These oxen are generally broken for riding when not more than a year old. The first ceremony is that of piercing the nose to receive the bridle; for which purpose they are thrown on their back, and a slit is made through

the septum, or cartilage between the nostrils, large enough to admit a finger. In this hole is thrust a strong stick stripped of its bark, and having at one end a forked branch to prevent its passing through. To each end of it is fastened a thong of hide, of a length sufficient to reach round the neck, and form the reins; and a sheep-skin, with the wool on, placed across the back, together with another folded up, and bound on with a rein long enough to pass several times round the body, constitutes the saddle. To this is sometimes added a pair of stirrups, consisting only of a thong, with a loop at each end, slung across the saddle. Frequently the loops are distended by a piece of wood, to form an easier rest for the foot. While the animal's nose is still sore, it is mounted and put in training, and in a week or two is generally rendered sufficiently obedient to its rider. The facility and adroitness with which the Hottentots manage the ox have often excited my admiration. It is made to walk, trot, or gallop at the will of its master, and, being longer legged and rather more lightly made than the ox in England, travels with greater ease and expedition, walking three or four miles in an hour, trotting five, and galloping on an emergency seven or eight."

In other parts of Central Africa the ox is employed in like manner. Major Denham thus gives an account of its use in the central countries which he visited:— "The beasts of burden," he observes, "are the bullock and the ass. A very fine breed of the latter are found in the Mandara valleys. Strangers and chiefs in the service of the sheikh, or sultan, alone possess camels. The bullock is the bearer of all the grain and other articles to and from the markets. A small saddle of platted rushes is laid on him, when sacks made of goat-skins, and filled with corn, are lashed on his broad and able back. A leathern thong is passed through the cartilage of his nose, and serves as a bridle; while on the top of the load is mounted the owner, his wife, or his slave. Sometimes the daughter or wife of a rich Shouaa will be mounted on her particular bullock, and precede the loaded animals, extravagantly adorned with amber, silver rings,

coral, and all sorts of finery; her hair streaming with fat; a black rim of kohal, at least an inch wide, round each of her eyes; and, I may say, arrayed for conquest at the crowded market. Carpets or robes are then spread on her clumsy palfry; she sits *jambe de ça jambe de là*, and with considerable grace guides her animal by the nose. Notwithstanding the peaceableness of his nature, her vanity still enables her to torture him into something like caperings and curvetings."

The ox was one of the first of the domestic animals carried over to America by the early Spanish settlers; there it has multiplied and spread, and indeed in some degree has recovered its original independence. Herds of wild oxen roam the Pampas, where they are hunted and slain for their hides, which form an important article of commerce. These wild herds are in some districts exceedingly numerous; they differ in no respect from their domestic relatives, and are themselves rendered tame without much difficulty. According to Azara, "Captain John de Salazar, born in the city of Pomar in Arragon, transported from Andalusia seven cows and a bull to the coast of Brazil; from thence he conducted them overland to the river Paraña at the place opposite to where it receives the river Mondai. He there constructed a raft, placed the cattle on it, and gave them in charge to a certain Gaëté, whilst he himself went by land to Paraguay. Gaëté descended the Paraña to its union with the river of Paraguay, and steering up this, he safely arrived at the city of Assumption in 1546. He spent many months in this voyage, and as he had only one cow given him for payment, the saying has hence arisen in allusion to the great value of anything, 'It is dearer than Gaëté's cow.' The second founders of Buenos Ayres took, in 1580, some cows from Paraguay, which multiplied in the neighbourhood; and, from want of due care, many of them became wild, and bent their course towards Rio Negro. The Indians of the Cordillera of Chili became acquainted with these animals, which had already attained their boundaries, and they commenced to carry from them herds of tamed cattle to Chili, where the presidents

of this settlement purchased them from these Indians. Those Indians who could not live in their country without some resource, established themselves in the plains which were occupied by these cattle, and some even mixed with the Pampas Indians. In the meantime, the Indians who were unsubdued destroyed the cattle to the south of Buenos Ayres; the Spaniards of those parts, however, did not neglect to take a portion, which they conducted to Cordova and Mendoza, whilst the Spaniards of Buenos Ayres made up entire cargoes of the hides of bulls and cows; for at that time the animal itself was not considered of value, its skin being all that was sought after. The result of all this (and the same will soon take place at Monte Video) was that towards the middle of the century wild cattle no longer existed in the Pampas; and the unsubdued Indians saw themselves under the necessity of stealing the domestic animals, or of making incursions into the estancias of the Pampas. This was the commencement and cause of the bloody war which the Spaniards had with the Indians. The herds of these revolted or wild cattle, which are also called oreillards in the plains of Monte Video, do not pass to the north of the southern establishments of the Guaranis Missions. The following is the account which I have collected of their origin:—The city authorities of Buenos Ayres, in the name of certain of its inhabitants, as is proved by its archives, made at the commencement of the century, contracts, on the one part with the English, for the acquisition of negroes, and, on the other part, with certain Spaniards, who were thus authorised to procure the hides of the animals on the plains situate to the north of the Rio de la Plate on payment to the city of a certain tax, of which the sum total was shared between these Spanish inhabitants, who from this circumstance were called Actionnaires. The primitive source of this right or this proceeding is not known, but certain it is that all the inhabitants did not participate in it, and that its produce was the exclusive share of these Actionnaires, who were the descendants of the earliest of the original settlers.

"For the elucidation of this affair it is necessary to consult history. We learn from it that Captain Jean Roméro set off from Paraguay, and, with his associates, founded, on the 24th of June, 1552, the city of St. Jean-Baptiste, opposite the spot where Buenos Ayres exists, at the mouth of the river St. Jean, and that the Indians attacked this city, and constrained the inhabitants, in the month of October of the same year, to abandon it with precipitation, and re-embark for Paraguay. There is reason to believe that the haste with which they fled, and the danger surrounding them, did not permit them to take away some cows which without doubt they had, and which they abandoned. In the year 1580, fifty soldiers set off from Paraguay, and founded Buenos Ayres; and it may be presumed that among them were some of those who had been at St. Jean-Baptiste, or of their heirs or descendants, who, on that account, had a right to the cattle in the plains of the same name; and that they were called *Actionnaires*, by way of distinction from those who, not being descendants of the founders of St. Jean-Baptiste, had not a similar right. Such is, in my opinion, the origin of the cattle of the north of the Rio de la Plate, since nothing goes to prove that any inhabitant of the southern parts had anciently transported cows thither; besides which it was very unlikely they should have done so, having, on the one hand, fertile plains in their neighbourhood, and, on the other, but very few vessels. . . . In these countries salt is not given to the herds of cattle, but they require absolutely to have the *barrero*, for so is called a saline or nitrous earth, which the herds of horned cattle, and even other animals, seek with avidity, and without which they fail, and die in the course of four months. From the twenty-seventh degree of south latitude to the Malovine Islands, the horned cattle, as well as other animals, have no need of the *barrero*, because the waters and the pasture-grounds are sufficiently salt; but northward, beyond this latitude, the *barrero* is necessary, and the plains which do not contain it, do not feed either the horse, the ass, the mule, the ox, the goat, or the sheep. The eastern half of the province

of Paraguay is destitute of *barrero*. It would appear that such is the case over the greater portion of Brazil,* which is the reason why so few cattle are reared there, and also why those that are, have, as Buffon observes, a diminutive stature, and ill-flavoured, disagreeable flesh. This author attributes these defects to the use of wild gourds as food in default of pasturage. But, in the first place, there is not a sufficiency of gourds for the purposes alluded to by Buffon; and, besides, there is there neither a barrenness of pasturage, nor any other deficiency than that of the *barrero* or salt. Setting aside this, cattle prosper in any district, even in the low and boggy lands, where good pasturage and pure water are found. But they prosper better in temperate, and even cold situations, as I infer from this that the cattle of Paraguay, although large, do not appear to me to be so large as those of Monte Video, where they occur somewhat larger than at Buenos Ayres. Buffon thinks that these cattle have degenerated, and that these animals are inferior in size to those of Europe. If he had seen the hides which are imported from this quarter, most assuredly he would talk in another manner. In fact, the cattle of Monte Video are, in my opinion, larger than those of Salamanca, although the bulls here are neither so active nor so fierce.

"I am talking of cattle generally, and not of a dwarf race which I have seen in the Corrientes,† which though it is much lower on the limbs, is nevertheless as stout, and even more stout and bulky in the body than the common race. This race, which multiplies, has doubtless originated from the common breed, and if it intermixes with it a mongrel race is the result.

"There are also many oxen in the province of Chiguitos, between the fifteenth and seventeeth degrees of latitude, but I know not their size. I say the same thing with respect to the Malovine Islands, where we

* In some parts of Brazil cattle are reared in great abundance.—See Spix, Koster, &c.

† Province situated at the north-west extremity of the province of Buenos Ayres.

have transported some heads of cattle, which, in 1780, already amounted to the number of 800, and which at present, in 1795 (*old style*), are upwards of 6000. There, neither shelter, nor covert, nor food is given them, and they have learned to dig in the snow in order to get to the vegetation beneath it. This experience is an argument for establishing that horned cattle not only prosper in cold countries, but also that the assertion of Buffon, that they become acclimated with more difficulty in snowy climates than horses, is erroneous.

"Wild cattle are such as live in vast troops at perfect liberty, flying from the appearance of hunters on horseback, and changing their place of abode when it suits them. In comparing these with domestic cattle, I see no difference either in size or anything else; nor is this strange, inasmuch as there is no difference in their general mode of life. . . . . A herd of wild cattle become tame in less than a month. The colours of these cattle are limited to dusky, or to reddish on the upper parts, the rest being blackish. Buffon says that the wild cattle of Africa, found at Cape Blanc and at Sierra Leone, are usually brown; and that those of Barbary and Numidia are dusky chestnut, colours which are pretty nearly the same as those above described." Besides these truly wild herds there are others in a sort of semi-domesticated condition, which are tended by keepers, and constitute valuable property; their hides, tallow, horns and flesh being all in requisition.

"A grazing-ground (estancia) of 15,000 *varres* (or yards) in length, and 5000 *varres* (or yards) in breadth, (that is to say, of two square maritime leagues,) can feed, it is said, 4000 head of cattle, under the direction of a superintendent and four men. The ordinary duty of these five individuals, a duty requiring a hundred horses, is to collect the herd once a week, driving them from all quarters to an elevated and open space which is termed the *rodéo* (or circuit). This is not a work of great trouble, because a horseman, shouting as he gallops along, makes them run of themselves towards the *rodéo*, and they do not stop until they reach it. . . . At Paraguay,

where there is much forest-land, the herds of horned cattle take refuge in the woods during the winter, and leave them in September, pursued by gad-flies, and by an infinite multitude of insects. In order that the cattle may be provided with a crop of tender grass the plains are fired; and if it happens that the conflagration encircles a herd of cattle, they dare the flames and dash through; the contrary is the case with horses and mares, which remain in the circle, violently kicking, until they are burnt to death. The horned cattle suffice here for almost every necessary of life; the greater part of the population neither taste bread, nor anything else besides flesh-meat. With the horns are made goblets, spoons, and combs; and with a cork at the large end, the small end being opened, a horn serves as a pitcher;—a vessel to hold water. The inhabitants form out of the hide all sorts of cordage and string, as well as the greater part of their utensils: on these hides they sleep, and with them they cover their cabins. The fat supplies the place of oil (for culinary purposes); of the suet they make soap and candles; the bones are a substitute for fire-wood in many places where the latter is wanting, and they are made to burn by the addition of suet; the skulls are used as chairs in the *estancias*. From the milk they make many various dishes of curds, which though in general not very excellent (because the milk, the cream, and every unctuous particle are removed), might be as good as in Holland: and the same may be said of the butter."

"It is known that from Buenos Ayres and Monte Video 800,000 ox-hides are annually exported to Europe. . . . In order to obtain these hides, some horsemen join together and arrange themselves in two ranks which form an angle; they then press on the two sides a small number of cattle, and one of the horsemen who goes last in the angle hamstrings the animals with a knife in the shape of a crescent or half-moon, fastened at the end of a staff. While this goes on the horsemen continue to ride forwards, and when they have thus secured a sufficient number of animals, they retrace their steps; and the person who hamstrung them gives each beast thus maimed

a finishing stroke with a sharp spear, and the horsemen dismount to strip the carcass, sometimes of the fat and suet, but always of the skin: this they do with such dexterity, that some men without assistance will strip twenty-six cattle at a day's work. When a single head of cattle is to be killed for the sake of its flesh, a horseman throws a lasso over its horns or neck, and another does the same over one of its feet; then straining in opposite directions they prevent it from struggling free and so strangle it. Admirable is the dexterity with which, when the animals pass as they rush forwards, the lasso is thrown, so that directed backwards under its feet, the animal at the pleasure of the horseman is entangled either by one foot or by two together."

Such is the origin of the horned cattle of these countries, where they prodigiously multiplied.* Mr. Darwin states, "that from Monte Video the annual exportation is three hundred thousand, and the home consumption from waste very considerable."

It is a singular feature in the history of the New World that so many of our domestic animals there imported should have returned to their primitive independence; the ox, the horse, the hog, the ass, the rabbit, the cat, and the dog, have thus estranged themselves from the control of man. Individuals have at different times escaped from confinement or been neglected; a vast region lay before them, presenting abundance of food; they multiplied, and their offspring in turn; and thus within a brief period have the plains of the New World been peopled by alien races of animals, which claim Asia or Europe as their starting-point.

America is not the only portion of the globe to which, by the agency of man, in modern times, the ox has been introduced. We allude to Australia, New Zealand, and the groups of islands which sprinkle the Pacific Ocean. "With the appearance of Vancouver," says Otho von

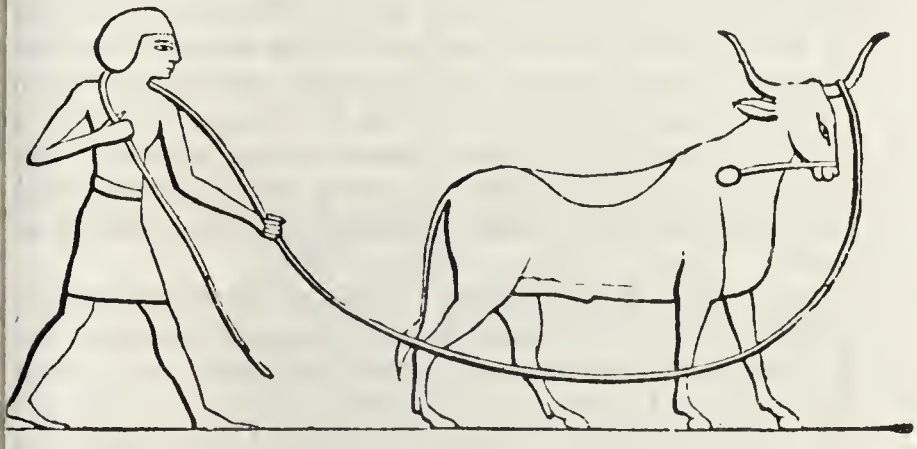
* In the Falkland Islands the wild cattle and horses were introduced by the French in 1764; the cattle are magnificent, but the horses small.

Kotzebue, speaking of the Sandwich Islands, "arose the fortunate star of these islands. Among the innumerable benefits he conferred upon them, they are indebted to him for the possession of sheep and cattle; Tameamea (the native king) declared these animals under a tabu for ten years, which allowed time for so large an increase that they now run wild in the forests." Of the benefits resulting from the introduction of the ox into a country naturally destitute of it, nothing need be said; but the gift of cattle to a people who, though yet uncivilized, are yet capable of appreciating their value, is to commence a revolution in their state and condition immeasurably for the better: for the possession of property is one of the bonds of society, and the desire of acquiring it the great stimulus to industry. With the introduction of the ox, the condition of the people of these islands must necessarily be improved. Not only will cattle be reared for home consumption, but for supplying the ships that navigate these seas (whalers, &c.), other valuables being given in exchange; hence will the rearing of cattle be generally undertaken: this involves care and attention, and a state of peace; agriculture and commerce follow, and prepare the way for the arts of civilized life.

To Asia and its border-lands let us turn our attention —regions in which the ox from the earliest epoch has been in a state of domestication, and where this animal, with sheep and goats, constituted the riches of patriarchs, and chiefs, or princes, who deemed it not beneath them to take an active interest in the management of their flocks and herds. In that age of patriarchal simplicity such scenes as that delineated by the pencil of Berghem were not imaginary, and the pastoral poetry of classical antiquity has not only rendered them familiar, but thrown an air of grace and even dignity over them.

In the fourth chapter of the Book of Genesis (ver. 20) we read of Jabal that "he was the father of such as dwell in tents, and of such as have cattle." In the thirteenth chapter of the same book cattle are enumerated as forming part of the riches of Abraham and also of Lot; and in the previous chapter we read that oxen were presented

by the Pharaoh of Egypt, together with sheep, asses, and camels to Abram, during his sojourn in that land. In the eighteenth chapter, veal, or the flesh of the calf, and butter and milk, are mentioned as articles of food. Subsequently abundant mention is made of all these domestic animals, while at the same time we glean that a wild race of oxen long continued to exist in Syria and the adjacent regions; for instance, in the Mosaic injunctions regarding animals to be used as food (Deut. xiv. 5) the wild ox is expressly noticed, and Isaiah alludes also to the wild bull ("as a wild bull in a net"). Hence it



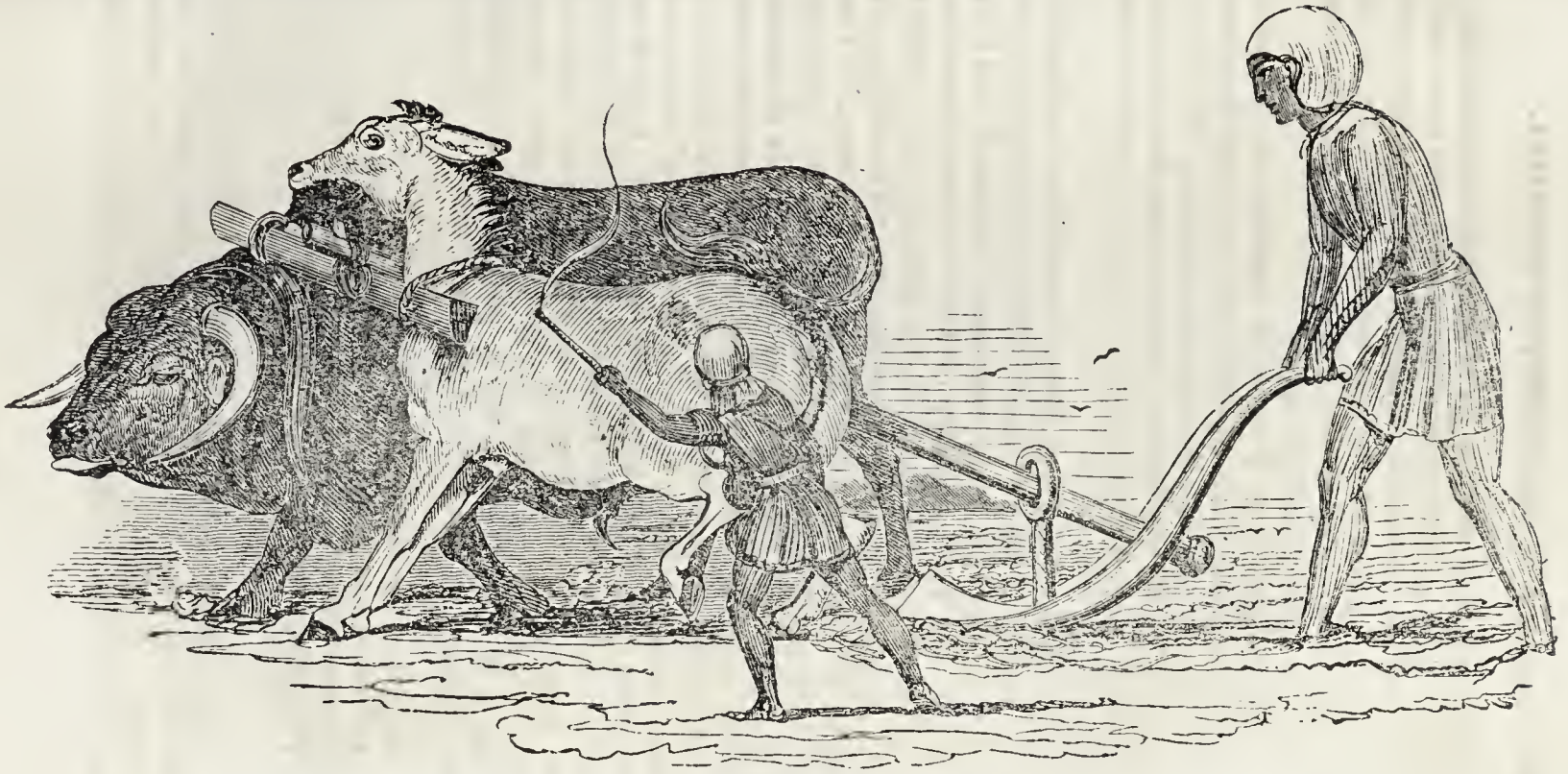
156.—Ox caught in lasso; Egyptian Sculpture.

would appear that though a domestic breed, established at a period antecedent to historic record, the Scripture outline excepted, formed part of the wealth of man in the primeval ages of his history, a wild race still tenanted their aboriginal pasture-lands. Wild oxen are exhibited in the Egyptian sculptures, and the chase of them is often represented: they were sometimes hunted with dogs, the huntsman bearing bows and arrows, and sometimes they were caught with the noose or lasso, as depicted in our outline. (Fig. 156.)

The utility of the ox was well appreciated in ancient times, insomuch that it became an emblematic object of worship among most of the nations of antiquity. The

traditions of every Celtic nation enrol the cow among the earliest productions, and represent it as a kind of divinity. Among the Egyptians the god Apis was worshipped in the form of a bull, and Herodotus describes the ceremonies attendant upon the choice of this bovine deity, to whose honour other bulls chosen by the priests were sacrificed. The goddess Isis was represented by the same people under the figure of a woman with the horns of a cow, as the Grecians represented Io; and the sacrificial offering was a bullock; the cow was never sacrificed, being sacred to Isis. The veneration of the cow was equally prevalent in Libya. The Libyans, says Herodotus, from Egypt to the Lake Tritonis, are breeders of cattle, eat flesh, and drink milk, but abstain from the flesh of cows, as do also the Egyptians, and will not keep swine. Nay, among the women of Syrene, to strike a cow is accounted a crime, because they celebrate the feasts and festivals of the Egyptian Isis. Neither will the Barcæan women taste the flesh either of a hog or of a cow.

In India, where in many points the practice and worship of the ancient nations were the same as those of the Egyptians, the ox was held sacred, and still is so by the Brahmins. The religious writings of India say that the cow was the first animal created by the three gods who were directed by the supreme lord to furnish the earth with animated beings. In the sculptures of the cave-temples of Ellora the sacred bull is represented with great truth and spirit. Colonel Tod ('Trans. Royal Asiatic Soc.' vol. ii., p. 560) says, "In Hindu mythology the bull Nanda is at once the guardian of one of the two gates of heaven, of Iswara, or Bal Siva, and his steed. The astronomic allusion thus blended with mythology is evident, viz., the entrance of the sun into the sign Taurus, the equinoctial festival of remote antiquity, and regarded as a jubilee by the Indo-Scythic nations hemming the shores of the Mediterranean to the Indian Ocean." We need not say how the idolatry of the Egyptians affected the Israelites, and mingled itself with the religious ceremonies of other nations, whose



157.—Ploughing with Ox and Ass.

worship required the ox as a sacrifice to imaginary deities. The estimation in which the ox was held, and which led to its consecration, did not arise from the circumstance alone of the cow yielding milk, nor from the value of the flesh of the animal as food, but from its services in agricultural labour.

It was employed as a beast of burden, for the cart, for the plough, and for treading out the grain from the ear. Our pictorial representations present us with many illustrations of its use in these points among the ancients, and which need no detailed description to render them intelligible.

The Mosaic ritual lays down several rules respecting the treatment of the ox: one forbids the yoking together of the ass and the ox in the same plough (Fig. 157), perhaps from the inequality of their size and strength, which would render the draught irregular, and oppress both animals. Another injunction is, "Thou shalt not muzzle the ox when he treadeth out the corn." The first idea suggested by this passage is, that the operation of threshing was effected simply by the feet of the cattle passing over the sheaves; and such indeed was the case in the times of patriarchal simplicity. Afterwards, as other passages show, rollers and wheels of wood, and threshing instruments with teeth, were used: these were drawn over the sheaves by oxen, and greatly facilitated the process. With respect to the primitive mode of threshing by means of the feet of oxen, there is express allusion to it by Homer, which proves that the practice was common in his time and country:—

"As with autumnal harvests cover'd o'er,
And thick bestrewn, lies Ceres' sacred floor,
Where round and round with never-wearied pain,
The trampling steers break out th' unnumber'd grain."
Pope's Tr. *Iliad*, xx., lines of Orig. 495-8.

The ancient Arabs, Egyptians, and Romans, as well as the ancient Greeks, threshed their corn in this manner: Virgil ('Georg.' lib. i.) describes the manner in which the threshing-floor is to be laid down, showing

that nothing like our modern mode of threshing could have been practised. In Syria, Egypt, and Nubia, at the present day, the grain is, as formerly, either trodden out by the feet of oxen or mules, or partly trodden out, and partly crushed out by means of a roller or other machine which the oxen drag after them, and which more or less destroys the straw, and even injures the grain. Figs. 158 and 159 represent two modes of threshing, viz. by the drag and by the sledge. Fig. 158 is formed of a frame of planks or a large block of wood, the under side of which is armed or roughened by flints or pieces of iron. It is drawn over or around the corn, while the driver sits or stands on the frame and guides the oxen. The other, Fig. 159, represents threshing by the sledge, which is fixed on wooden rollers armed with iron rings, and the driver is seated on a kind of chair fixed on the sledge. The oxen being driven about over the corn, the grain is trodden out while the rings cut up the straw into fragments. This instrument is still employed in Egypt and in some parts of Western Asia. It corresponds to one described by Varro, as being in use in his time in Hither Spain (Hispania Citeriore), and which

158.—Oriental Threshing with the Drag.

159.—Oriental Threshing with the Sledge.

he calls, 'plostellum Pœnicum,' having been, as he says, introduced by the Carthaginians, who had borrowed it from the Phœnicians.

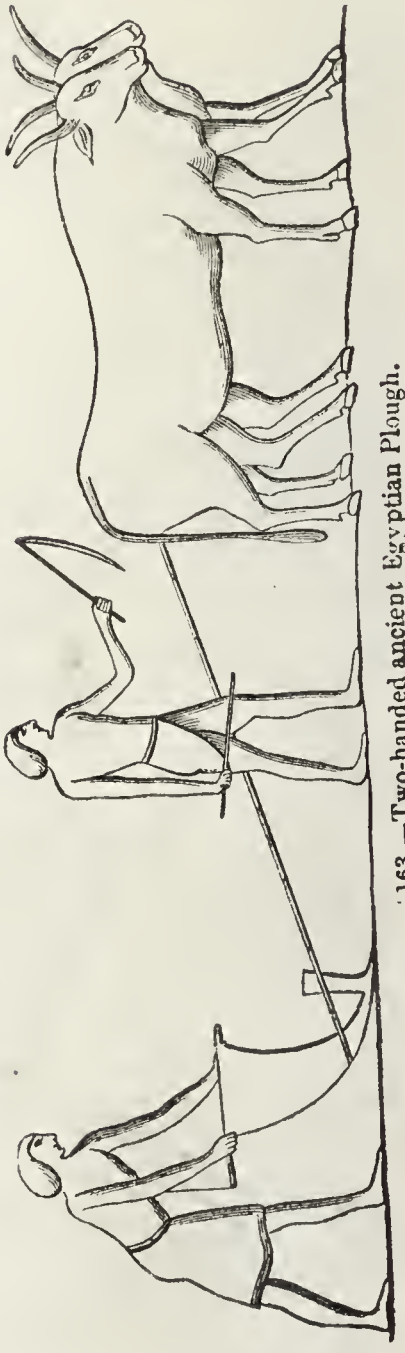
Our representations of oxen drawing the ploughs in ancient times, and in Egypt at the present day, illustrate many allusions in the sacred and classical writers. The plough was a very simple instrument, as it still continues in the East, and is rather formed for turning up superficially a light soil, than for making deep furrows in heavy land. It appears that the ploughman, to work it effectually, was under the necessity of guiding it with great care, bending over it, and loading it as far as possible with his own weight, otherwise the share would only glide the surface without making a furrow, and the slightest inattention or cessation of his labour would be followed by the dragging out of the share from the earth, or by irregularity in the depth and direction of the furrow; hence the expression of Pliny, "arator, nisi incurvus, prævaricatur."

The cuts afford an interesting exemplification of the progress made in the improvement of the construction of the plough. It was at first drawn by men, and of this practice illustrations exist on some of the Egyptian monuments. The ox was, however, soon pressed into the service of

160.—Ancient Egyptian Ploughing.

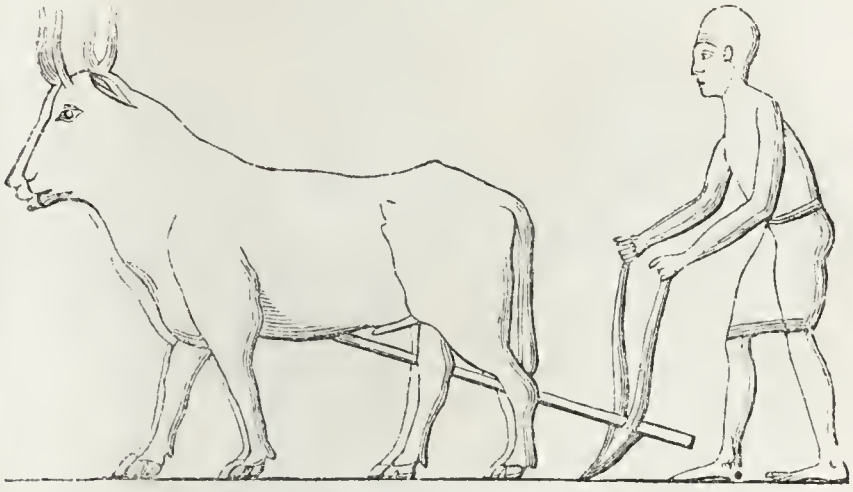
161.—Ancient Egyptian Ploughing.

162.—Ancient Egyptian Ploughing.



163.—Two-handed ancient Egyptian Plough.

the agriculturist, and Fig. 160 shows perhaps the simplest form of the application. In this the ploughshare is little more than the old hoe, to which a wooden bar is attached which the oxen draw, supplying greater strength, but allowing very insufficient means of guidance, and the depth of the furrow depending altogether upon the strength and skill of the man who held the plough-handle, while the straightness of the furrow depended on the driver of the oxen. In Fig. 161 the form is a little improved. By a slight alteration in the handle, the holder is enabled to use one hand for the whip, and



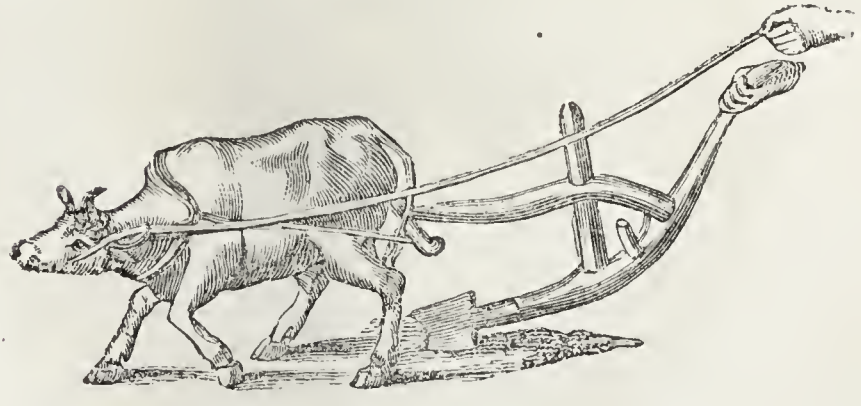
164.—Ancient Egyptian Ploughing.

thus to guide the oxen himself. The next step was to form a ring-hole or handle to the piece of wood which joined the share, while the pole moved freely in another ring. (Fig. 162.) This enabled the ploughman the more easily to force down the share, and to avoid and regulate the irregular movements occasioned by the unequal resistance of the soil. The two-handed plough (Fig. 163) effected the same purpose more effectually, but though an improvement, it involved the necessity of a separate driver, as both hands were now occupied. In the next stage the hind part was formed

135.—Modern Egyptian Ploughing.

into two crooked horns, uniting at the bottom into a solid piece with the share, while the pole was still left free to rise or fall. (Fig. 164.) This gave the ploughman a more powerful leverage, and enabled him to regulate far more effectually the depth and straightness of the furrow, while he could still use one hand occasionally to guide the oxen. So constructed, the old Egyptian plough differs but little from that used in parts of France at the present day, and which is called the *araire*. There is no evidence that the Egyptians ever applied the wheel to any of their ploughs. Fig. 166 shows the plough as represented on the shield of Achilles, as given by M. Quatremère de Quincy as the form of the old Greek plough; and Fig. 167 is that of an old European

166.—From the Shield of Achilles.



167.—Ancient Plough.

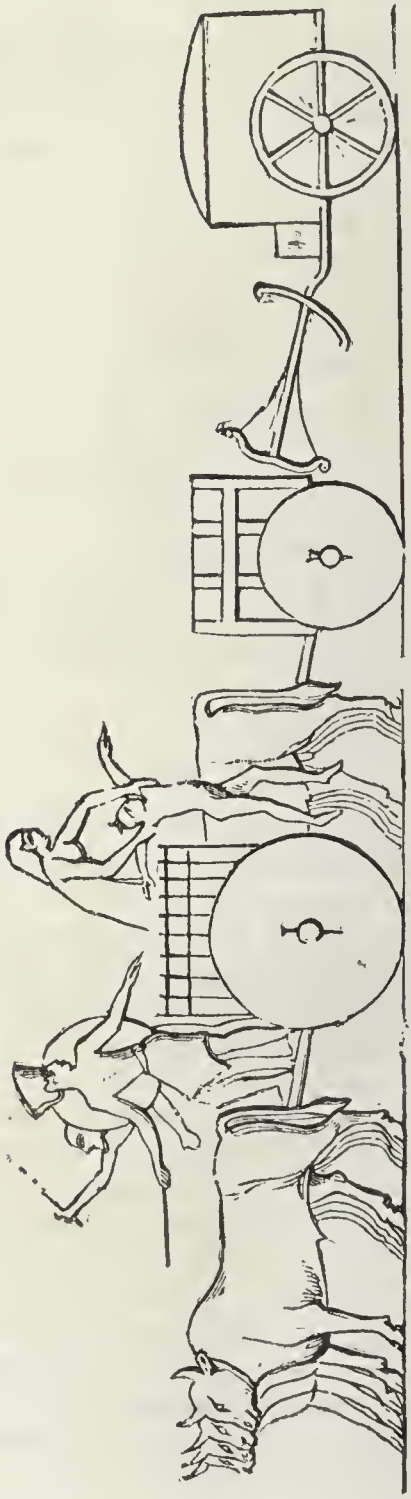
169.—Modern Syrian Plough.

plough. The plough of the modern Egyptians is less light and certainly less elegant than that of their progenitors (Fig. 165), nor is it so effective as the one we have last described. The modern Syrian plough (Fig. 168) has even more resemblance to the early Egyptian ploughs. Wilde, who travelled in Palestine, says, the plough "resembles the ancient Egyptian plough, and does little more than scratch the soil, making a furrow scarcely three inches in depth." Most of the early Egyptian figures do not show in what way the oxen were attached to the plough, but from Fig. 160 and Fig. 161 it can be seen that it was by the horns. This was not the case with the Hebrews, by whom the yoke was laid on the neck of the oxen, which is also done now both in Egypt and Syria.

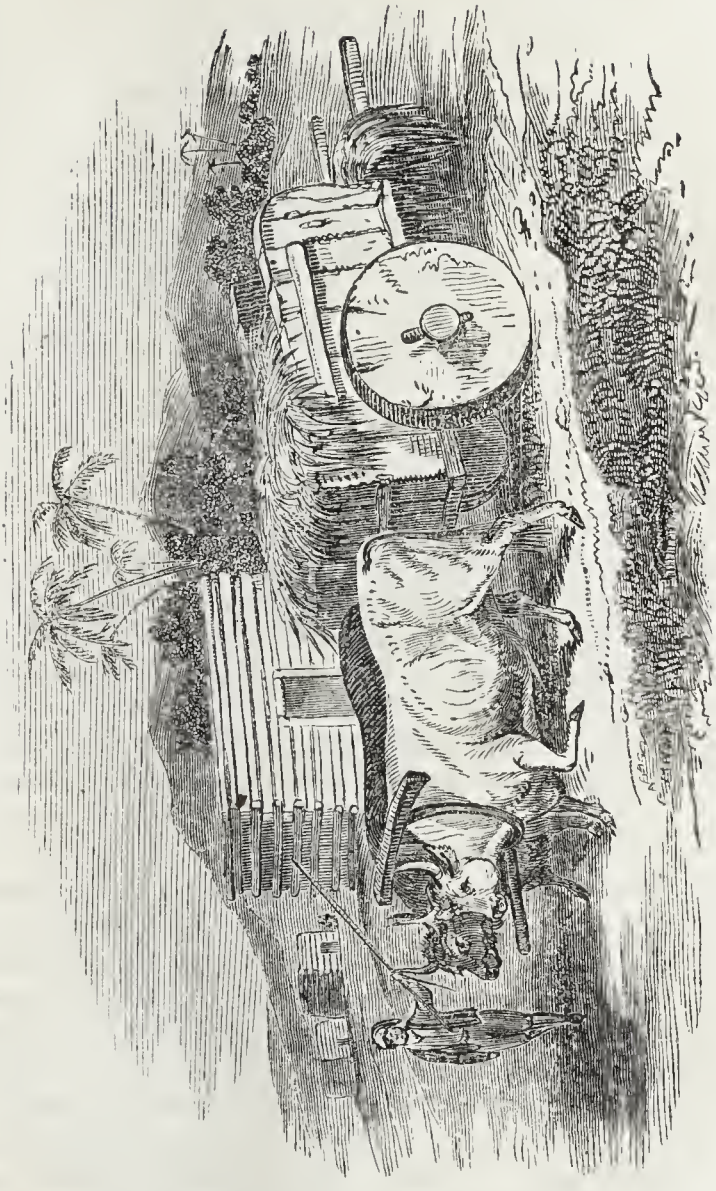
The illustrations of the use of the ox in ancient times in Egypt (Fig. 169), and in modern Syria (Fig. 170), as well as in Tartary by the nomadic people (Fig. 171), need no particular comment.

The Zebu.

Whether the Zebu breed of oxen be derived, as some contend, from a distinct origin from that of the ordinary ox, we will not attempt to determine; suffice it to say that it presents marked peculiarities which clearly characterize it. Narrow high withers surmounted by a large fatty hump, and arched back rising at the haunches and suddenly falling to the tail, slender limbs, a large pendulous dewlap falling in folds, long pendent ears, and a peculiarly mild expression of the eye, proclaim the Zebu race—a race varying in size from that of our largest cattle to that of a young calf. (Fig. 172.) This breed is spread over India, China, and the Indian Islands; it is also found in Madagascar and on the eastern coast of Africa, in the interior regions, and parts of the western coast, and is used for the ordinary purposes of draught and burden. India appears to be its parent country, and we may readily believe that in remote ages, when an extensive commerce existed between that



169.—Oxen and Carts; from Egyptian Sculpture.



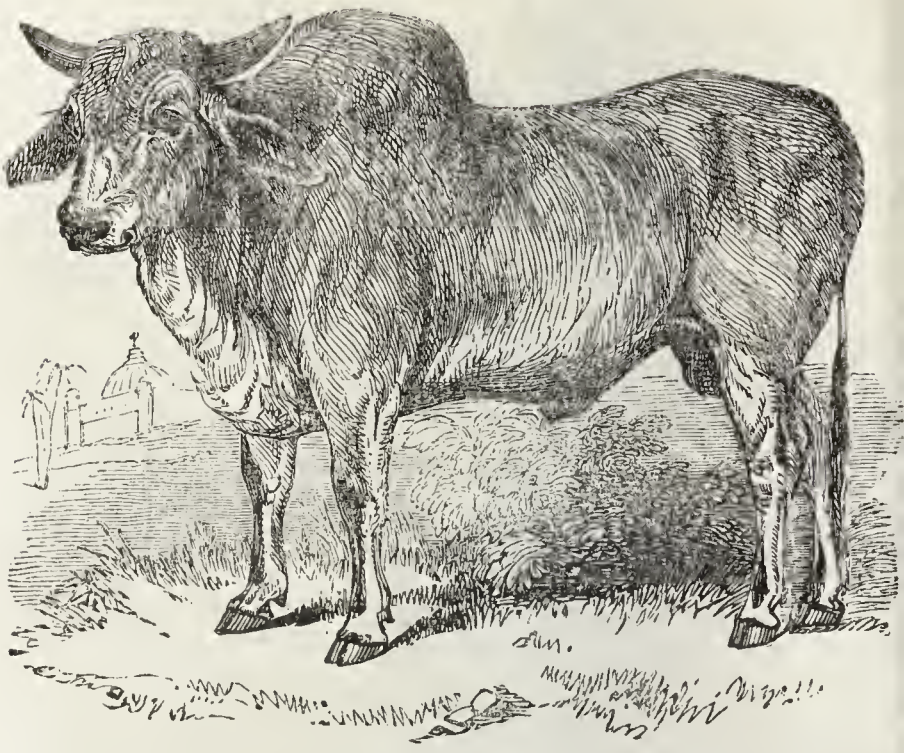
170.—Modern Syrian Cart.

country and Egypt, it was introduced into the land of the Pharaohs. In upper Egypt, Abyssinia, and Ethiopia (Fig. 173) it is now almost exclusively prevalent; but in Lower Egypt, as we learn from Burckhardt, the Zebu or humped race is unknown. In the ancient Egyptian representations of animals, both the humped race and the ordinary ox with long horns are clearly depicted. (Fig. 86.) It is the zebu ox which is sculptured in the cave-temples of Ellora, and the seven pagodas, as they are commonly called, at Mahámalaipur on the Coromandel coast. We have thus proofs of the extreme antiquity of this breed, and of its distinctness at a remote era from the ordinary ox, and that its peculiar characters were what we now see.

Buffon observes that the ox without a dorsal hump (which he erroneously terms the Aurochs race) occupies the cold and temperate zones, and is thinly distributed towards the regions of the south; on the contrary, the ox with the hump (which he terms, also erroneously, the Bison race) exclusively occupies all the southern regions—namely, the entire continent of the Indian empire, the islands of the Eastern and Southern seas, and the whole of Africa from Mount Atlas to the Cape of Good Hope, including Madagascar, and the island of St. Juan on the channel of Mozambique. With respect to the Cape of Good Hope, it is certain that the zebu race does not prevail there, at least in the present day; but F. Leguat (see his 'Voyages,' &c., 1720) observes that "the oxen are of three sorts at the Cape of Good Hope, all of a large size and very active; some have a hump on the back, others have the horns long and pendent, while others have them turned up and well-shaped, as in English cattle."

With respect to the ox represented on the Greek and Roman sculptures, which is not of the true zebu race, it must be confessed that in many points, and more particularly in the pendulous folded dewlap, it resembled the zebu, and may probably have been the ultimate product of a mixture of the zebu race, introduced at an early date from India, with the ordinary cattle of Greece and

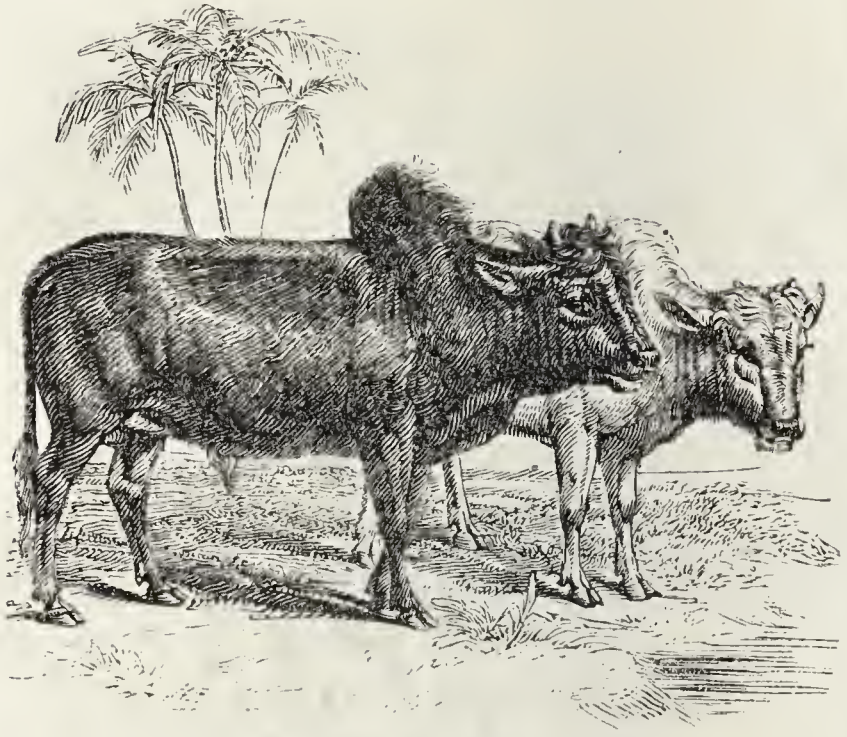
171.—Bullock Carts of the Nomade Tartars.



172.—Indian Zebu.

Italy. This, however, is a mere suggestion. In the Greek sculptures the ox is represented without any hump, but the withers are high and the crupper rounded. "To the classical antiquary," says a talented writer, "we beg to suggest that the dewlap of the Brahmin bull offers an object of much attention and interest, by reason of its sharp and decided outline, and perpendicular creases or folds, wonderfully verifying the correctness of those Greek sculptures on bronze and marble, in medals and statuary, in which we see representations of Victory sacrificing a bull, of the oxen of Ceres, &c. These representations will no longer be considered out of drawing by those who may have an opportunity of examining the sacred bull of India, nor exaggerated in their fore-quarters, although critics of the last century (less fortunate in this respect than the visitors of the Zoological

173.—Zebus and Ethiopian Car.



174.—Zebus of the Zoological Gardens.

Society's gardens) have determined them without hesitation to be altogether incorrect." Several beautiful specimens of the zebu ox, both of the large-sized variety and also of the dwarf caste, are in the Zoological Gardens. They are remarkable for their docility and quiet temper. (Fig. 174.)

Mr. Youatt informs us that a beautiful zebu bull and cow of the Nagore breed were exhibited at the Christmas Cattle-show in 1832, and adds, that they were bred by Lieut.-Colonel Skinner, on his farm at Danah near Pokah, on the borders of the Bichaneer desert, a hundred miles to the westward of Delhi. They were of the highest breed of Indian cattle, used by the higher orders to draw their state-carriages, and much valued for size, speed, and endurance. The specimens in question "arrived at Calcutta, a distance of fourteen hundred miles, in January, 1829, and were then something under

six months old. They were sent as a present to Mr. Wood, who was then residing at Calcutta, and by whom they were forwarded to Mr. Perkins. Colonel Skinner has a large stock of them, and six or seven beasts are always kept saddled, to carry the military dispatches. They remain saddled three or four hours, and, if not wanted in that time, fresh ones are brought out to relieve their companions. They will travel with a soldier on their back fifteen or sixteen hours in the day, at the rate of six miles an hour. Their action is particularly fine, nothing like the English cattle with the sideway circular action of their hind-legs: the Nagore cattle bring their hind-legs under them in as straight a line as the horse. They are very active, and can clear a five-barred gate with the greatest ease. Mr. Perkins has a calf which has leaped over an iron fence higher than any five-barred gate, and the bull frequently jumps over the same fence in order to get at the water, and, when he has drunk his fill, leaps back again." . . . "Mr. Perkins very properly observes, that the chief advantage of these Brahmin bulls would probably consist in their speed and strength, in both of which they surpass any of our breeds."

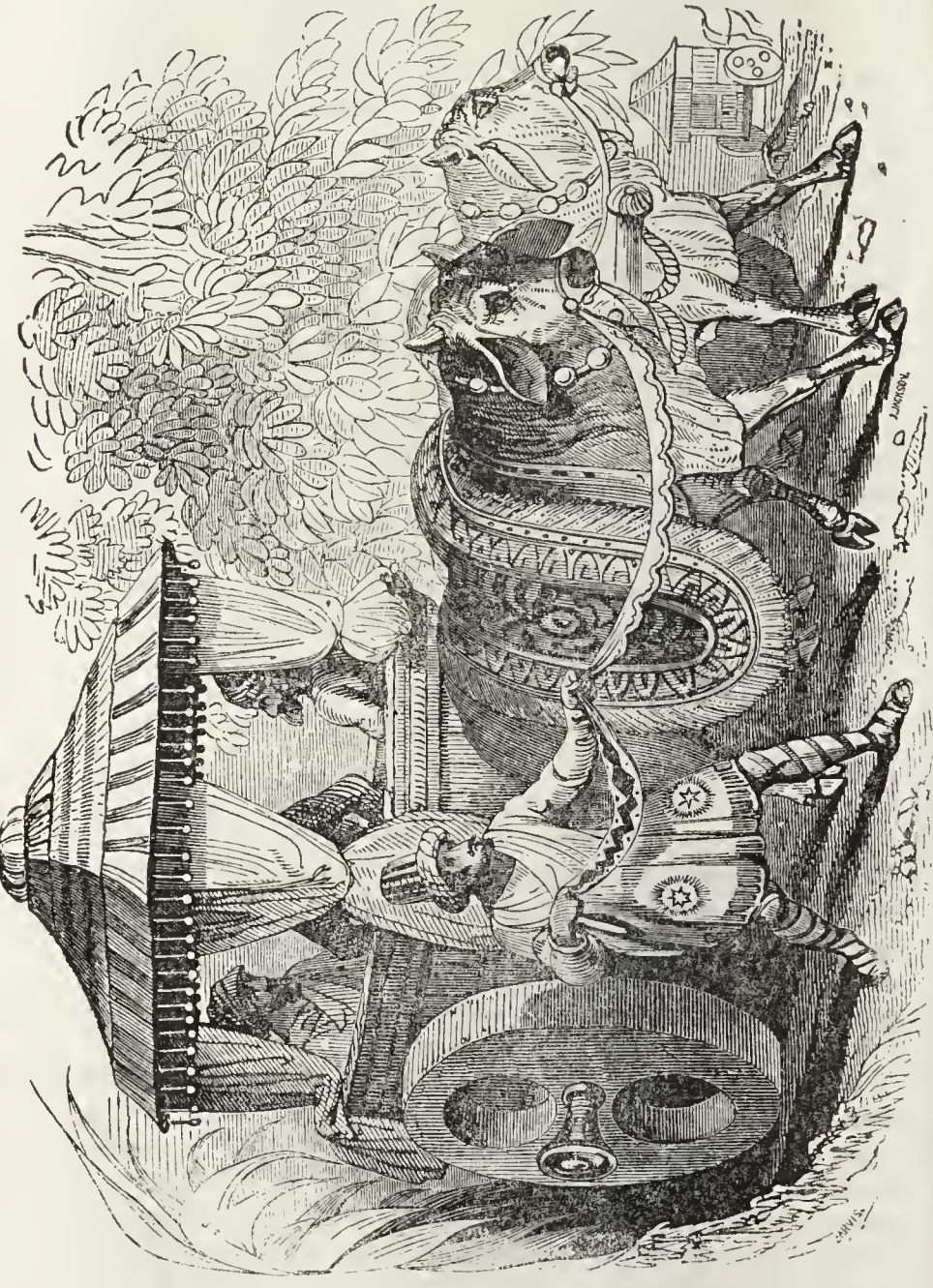
Of the extensive use and consequent value of the Brahmin or large zebu breed in their native climate we can scarcely form an adequate idea. In some parts of India the dwarf races are unknown, and this is bred exclusively. According to an observation of Colonel Sykes, in the 'Proceeds. Zool. Soc.' the Brinjarees, a singular erratic people, possess vast herds, and breed the Brahmin cattle on an extensive scale; "and an army rarely moves in the field without 15,000 or 20,000 bullocks to carry its grain. Dwarf cattle are not met in Dukhun.' The buffalo, however, divides the palm of usefulness with the zebu in the agricultural labours of India, and is preferred for many purposes, on account of his more robust constitution. In the Mawals, or hilly tracts among the Ghauts, this animal supersedes the zebu. "In those tracts," says Colonel Sykes, "much rice is planted, and the male buffalo, from his

175.—Brahmin Zebu Bull.

superior hardihood, is much better suited to resist the effects of the heavy rains and the splashy cultivation of rice than the bullock. The female is also infinitely more valuable than the cow, from the very much greater quantity of milk she yields." In point of beauty and docility there is no comparison between the heavy savage buffalo and the "Sacred bull of Bramah." Nor is the former ever devoted to Bal-Siva as a meritorious offering. On the contrary, it is common to meet with Brahmin bulls thus devoted, which wander at their pleasure, exempt from the servitude of the yoke, and which are regarded as endowed with a sacred character. (Fig. 175.) The beautiful form and sleek appearance of these fortunate creatures particularly engaged the notice of Bishop Heber. The first which the bishop met in his journey was grazing in a green paddy-field, and was branded on the haunches with the emblem of Siva. He crossed their path tame and fearless, and, seeing some grass in one of the Europeans' hands, coolly walked up and smelt it. These privileged bulls are turned out when calves, on certain solemn occasions, by wealthy Hindoos, as acceptable offerings to the divinity Siva. To strike or any way injure or molest one of them is held as a mortal sin. "They feed," he observes, where they choose, and devout persons take great delight in pampering them. They are exceeding pests in the villages near Calcutta, breaking into gardens, thrusting their noses into the stalls of fruiterers' and pastry-cooks' shops, and helping themselves without ceremony. Like other petted animals, they are sometimes mischievous, and are said to resent with a push of their horns any delay in gratifying their wishes."*

Between this absurd reverence for consecrated bulls and the ordinary treatment of the working ox there is a vast distinction; the latter is harshly and often severely treated. The cow, however, has more forbearance exercised towards her than from the treatment of the ox might be expected. Bishop Heber, speaking of the mode of treading out the corn still practised in India,

* 'Journey,' vol. i., p. 145.



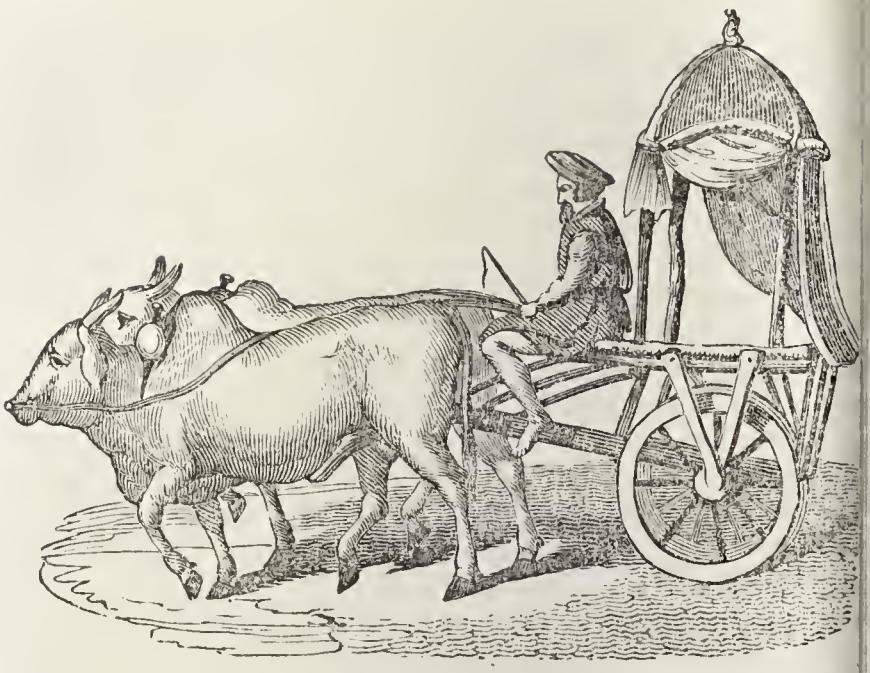
76.—Zebus and Indian Car.

relates the following:—"One of the Hindoo farmers was threshing out a small kind of millet by driving oxen over it, round and round in a circle. They were just leaving off work as I came up, and a hind was bringing a large bundle of green Indian-corn, weeded from the thick crop, for their provender. I observed, however, that the animals, during their previous employment were not muzzled, according to the Scriptural rule, at the same time that they were kept so constantly moving, that a few mouthfuls were all they could get. While I was examining this heap of grain, and asking the old man some questions, his cows came for the evening, and I pleased him exceedingly, when the cowman ran forward to beat them from my path, by forbidding him to strike them, 'Good! good!' he said, with an air of much satisfaction; 'one must not beat cows.' It seems to me that the tender mercies of the Hindoos towards animals are exhausted on cows (and Brahmin bulls) only; for oxen they have no pity—they are treated with much severity."* That the ox should be severely treated or employed in hard work by the Brahmins seems a sort of contradiction to the principles by which these people profess to be guided; but such inconsistencies are too common to be surprising.

Thévenot, who describes the zebu oxen of India as excellent both for the saddle and draught, adds that some gallop as well as a good horse, and goes on to state that they are equally used for the plough and for coaches and chariots. They are harnessed by means of a long yoke at the end of a pole which is placed on the neck of the two oxen, and the driver holds in his hand the cord which is attached to a small double cord passed through the gristle of the nose, instead of a bit in the mouth, as in the case of the horse. (Figs. 176 and 177.)

It would appear that white oxen are highly esteemed in India, as they have also been in other parts of the world. Olearius (tome i., p. 458) notices the procession

* 'Journey,' vol. i., p. 311.



177.—Zebus and Car.

of an Indian prince, who was drawn in a carriage by two white oxen, which had the neck short and a hump between the shoulders, but which were as lively and active as horses. Bishop Heber observes that the Thakoors, the nobility of the Rajpoots, generally travel in covered waggons drawn by white oxen, whose horns they gild. Tavernier observes, "The two oxen which were harnessed to my carriage cost me nearly six hundred rupees. The reader need not be astonished at this price; for these are oxen of great strength, and which travel journeys of twelve to fifteen leagues a day for sixty days, and always on the trot. When they have done half their day's work they have two or three balls (the size of a penny loaf) of wheaten flour kneaded with butter and coarse sugar; and in the evening their ordinary fare consists of chick-peas bruised and steeped half an hour in water.

Of the docility, activity, and services of the zebu ox in India much more need not be said. Numerous tra-

178.—Zebu and Lion fighting.

vellers, both in the past and present century, give the same testimony, and record observations bearing upon the same point.

Receding westward from India to Persia, we gradually lose the zebu race, or at least find it intermingled with that of another type. Chardin (vol. ii.) observes, "The oxen of Persia are like ours, excepting towards the frontiers of India, where they have the hunch on the back. Throughout the whole country, the ox is seldom eaten as food; it is only reared as a beast of burden or for tillage. Such as are used for burdens are shod with iron in consequence of the stony mountains over which they have to travel." The shoeing of oxen, where the country is rugged, and the roads hard or stony, is also practised in India, as Thévenot relates, but is not a general custom. The shoes are light, and two are placed on each foot, as the cloven character of the hoof necessarily requires, so that the natural freedom of each part is not impeded. In Persia the bull is often made to fight with the lion, and sometimes comes off victorious, though dreadfully lacerated. (Fig. 178.) In some parts of Turkey also the zebu is used for drawing the carriage or arabah. (Fig. 179.)

Thus much respecting the distinction between the zebu race of cattle and the ordinary breeds of Europe, and their apparently natural distribution. Whichever breed or race we contemplate, we shall find it adapted to the service and necessities of man, its value being in proportion. It will readily be admitted, however, that the interest which attaches to the ox does not arise from its intelligence, but from its absolute utility: the pleasure which the mind experiences when we gaze on peaceful herds feeding in tranquil security is of a complex origin, the result of an association of ideas more or less remotely connected with the presence of these creatures, which, time immemorial, have formed the wealth of man, and which have therefore engaged alike the attention of the statesman, the poet, and the philosopher.

Fig. 180 represents the simple but efficient mode adopted in Normandy of preventing the cow, by means

179.—Zebus and Turkish Arabah.

of a sort of martingale, from nibbling and breaking down the lower branches of the apple-trees with which the vast corn-fields of that district are studded, or which form extensive but unfenced orchards. The apple is there greatly cultivated for the sake of cider, the "bon cidre de Normandie" being greatly celebrated.

180.—Cow with Martingale.

The Gayal (*Bos Gavæus*).

Gavaya, Sansc.; Gavaï or Gayâl, Hind.; Gobaygoru, Beng.; Gaujangalí, Pers.; Méthaná, Mountaineers (Cúcís, &c.) east of Silhet; Shiál, Mountaineers (Cúcís) east of Chatgaon; J'hongnua, Mugs; Núnec, Burmas; Gauvera, Ceylon.

India presents us with several species of wild oxen, independent of such as belong to the buffalo tribe, some of which are domesticated in certain districts, beyond which they are not dispersed; such is the Gayâl. Ac-

cording to Mr. Macrae, the gayâl is found wild in the range of mountains that form the eastern boundary of the provinces of Arracan, Chittagong (Chatgaon), Tipura, and Silhet. The Cúcís, or Lunetas, a people inhabiting the hills immediately to the eastward of Chatgaon, have herds of them in a domesticated state. The animal is called Gabay in the Hindu Sástra, but, as it would appear, is little known beyond the limits of its native mountains, except to the inhabitants of the provinces above mentioned. We learn from the same author that the gayâl is of a dull heavy appearance, but that its form at the same time indicates great strength and activity, like that of the wild buffalo. Its disposition is gentle, and in a wild state on its native hills it is not considered dangerous, never standing the approach of man, much less sustaining his attack. The Cúcís hunt the wild animals for the sake of their flesh. The gayâl is a tenant of the forest, and prefers the tender shoots and leaves of shrubs to grass: it never wallows in the mud like the buffalo. In a state of domestication among the Cúcís, it does not undergo any labour, nor is the milk of the female, which though small in quantity is extremely rich, held in any request: the animals are bred and reared solely for the sake of their flesh and hides, of which latter the Cúcís form strong shields. These domesticated herds roam at large in their forests during the day, but return home to their villages in the evening, being taught to do this very early by being fed when young every night with salt, of which these animals are very fond. Though the Cúcís slaughter the domestic gayâl, the Hindus in the province of Chatgaon will not kill this animal (their gabay), which they hold in equal veneration with the cow, but they hunt and kill another gayâl (as l'gáyâl, or Seloï), as they do the wild buffalo.

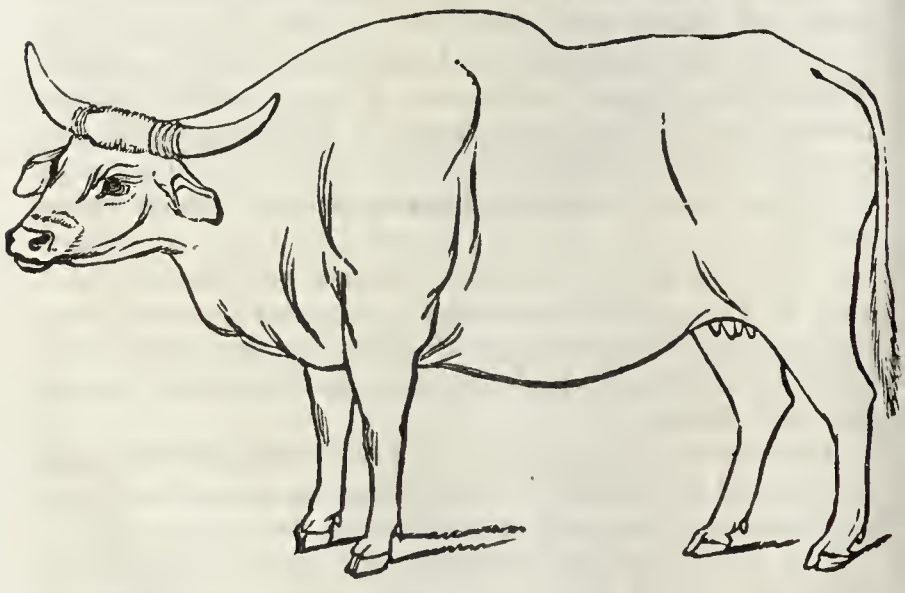
The cry of the gayâl is a kind of lowing, shriller, but not so loud as that of the European ox, without any resemblance to the grunt of the buffalo.

The gayâl is nearly of the size and shape of the English bull; it has short horns, which are distant a

their bases, and rise in a gentle curve upwards and outwards, their transverse section near the base ovate; the forehead is broad, and crowned with a tuft of lighter coloured, long-curved hair; the dewlap is deep and pendent; there is no mane, or hump, as in the zebu, but the withers rise to a considerable elevation. The tail is short, the body covered with a tolerable coat of straight dark-brown hair; on the belly it is lighter coloured, and the legs and face are sometimes white. The form of the animal and the way in which it carries its head will be understood from our cut (Fig. 181), which is reduced from that by a native artist, prefixed to Mr. Colebrooke's paper on this species, in the 'Asiatic Researches' (vol. viii.).

From various experiments it is proved that the domestic gayâl will breed with the ordinary zebu cattle of India; but whether the offspring will interbreed with each other has yet to be ascertained.

Fig. 182 is the head of the true wild gayâl, or, as the natives term it, Aseel Gayâl, from a drawing by General Hardwicke: the specimen was a female from the south-east frontier of Bengal.



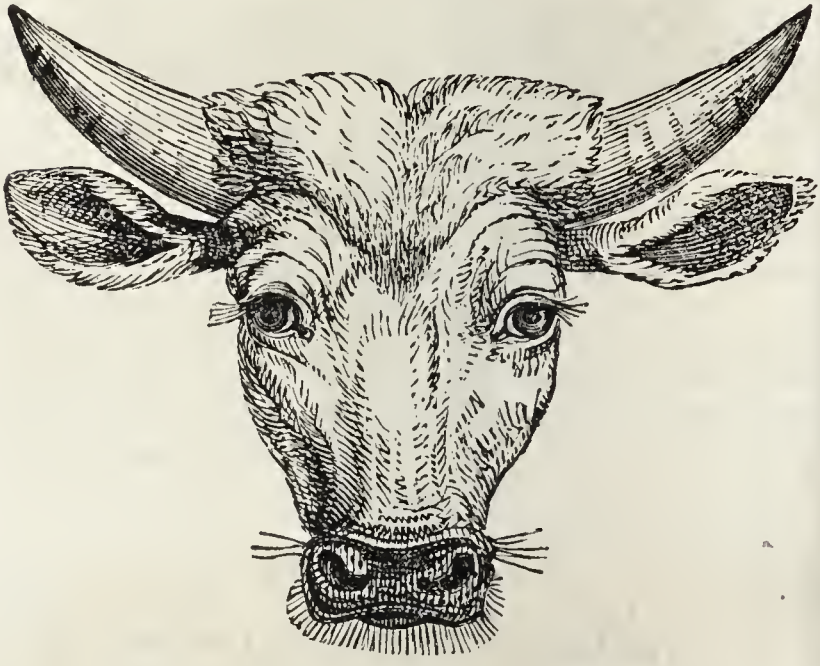
181.—Gayâl.

182.—Head of Wild Gayâl

The Gyall (*Bos frontalis*, Lambert).

In the seventh volume of the 'Linnæan Transactions' will be found the figure and description of a Gyall (which died in London in 1802), by A. B. Lambert, Esq., who quotes he following letter from George Harris, Esq., this latter gentleman being well acquainted with the domestic gyall in its native country: referring to a communication from Mr. Lambert, he writes, "I have before me your note, with the drawing, which appears to me to be the figure of the animal I mentioned to have in my possession. Some parts of the drawing seem to be rather too much enlarged, as the base of the horns and the rising between the fore-

shoulders. The animal I described to you, and which I have kept and reared these last seven years, and know by the name of the gyall, is a native of the hills to the north-east and east of the Company's province of Chittagong, in Bengal, inhabiting that range of hills which separates it from the country of Arracan. The male gyall is like our bull in shape and appearance, but I conceive not quite so tall, and of a blackish brown



183.—Head of Gyall.

colour; the horns short, but thick and strong towards the base, round which, and across the frons (chaffron), the hair is bushy, and of a dirty white colour. (Fig. 183) The chest and forehead are broad and thick. He is naturally very bold, and will defend himself against any of the beasts of prey. The female differs little in appearance: her horns are not quite so large and her make is somewhat more slender; she is very quiet, and used for all the purposes of the dairy, as also (I have been informed by the natives) for tilling the

ground, and is more tractable than the buffalo. The milk which these cows give has a peculiar richness in it, arising, I should conceive, from their mode of feeding, which is always on the young shoots and branches of trees, in preference to grass. I constantly made it a practice to allow them to range abroad amongst the hills and jungles at Chittagong during the day to browse, a keeper attending to prevent their straying so far as to endanger losing them. They do not thrive in any part of Bengal so well as in the afore-mentioned province, and in the adjoining one, Tipurah, where I believe the animal is also to be found. I have heard of one instance of a female gyall breeding with a common bull."

Lesson, and the author of the article 'Ox' in the 'Penny Cyclopædia,' seem to regard the Gayâl and the Gyall as distinct; from the descriptions, however, which are given, it is quite evident that they relate to one and the same species, as Fischer, in his 'Synopsis Mammalium,' considers them to be. The title *frontalis*, therefore, must be retained by right of priority over

184.—Jungly Gau.

Gavœus. Among the synonyms given by Fischer, are, "*Bos Bubalus Gauvera*, Pennant, 'Quadr.'; *Gauvera*, Knox, Ceylon; *Bantinger Javan.* and *Bos Sylhetanus*, F. Cuvier. The *Bos Sylhetanus*, the Jungly Gau, and the Aseel Gayâl, are then identical."

Fig. 184 is a representation of the male Jungly Gau, or Aseel Gayâl (*Bos frontalis*, Lambert; *Bos Gavœus*, Colebrooke; *Bos Sylhetanus*, F. Cuv.).

Duvaucel, who hunted this animal at the foot of the Silhet mountains, describes it as very wild, but easily domesticated; he states, that until he had opportunities of seeing it in a state of nature, he entertained the opinion that it did not differ essentially from our domestic ox, his impression being received from an inspection of specimens living tame in the menagerie at Barrackpore: subsequently he regarded it as distinct.

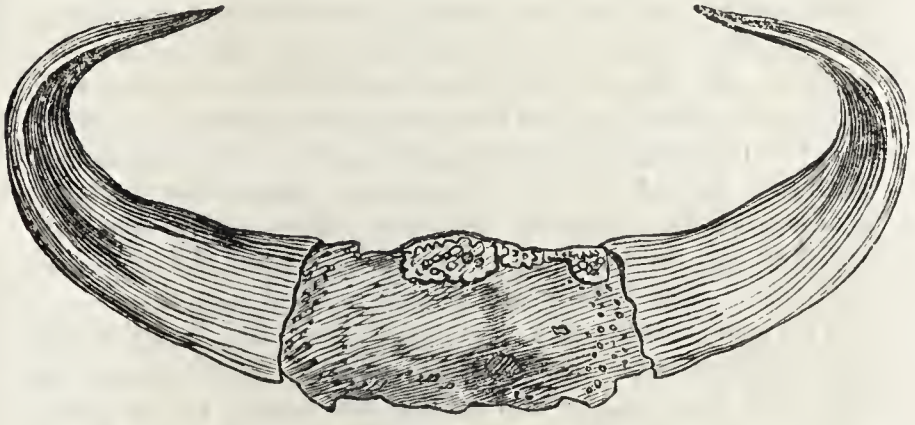
The Gour

(*Bos Gour*, Traill, in 'Edinb. Phil. Journ.' Oct. 1824).

Of this noble species of wild ox we are able only to give a figure of the horns from a drawing by General Hardwicke. (Fig. 185.) The gour to which they belonged was killed, as General Hardwicke believed, by the same hunting-party described by Capt. Rogers, and the horns were presented to the General by the principal member of that party, the late Major Roughsedge. These horns were fifteen inches between the tips; their colour is horn-gray, with black and solid tips, which are extremely sharp. A fine pair are in the museum of the Zoological Society of London.

According to Capt. Rogers, the gour occurs in several of the mountain-districts of Central India, but is chiefly found in Myn Pât, or Mine Paut, a high insulated mountain with a tabular summit in the province of Sergojah, in South Bahar. "This table-land is about thirty-six miles in length, by twenty-four or twenty-five miles in breadth, and rises above the neighbouring plains probably two thousand feet. The sides of the mountain slope with considerable steepness, and are furrowed by

streams that water narrow valleys, the verdant banks of which are the favourite haunts of gours. On being disturbed they retreat into the thick jungles of saul-trees which cover the sides of the whole range. The south-east side of the mountain presents an extensive mural precipice, from twenty to forty feet high. The rugged slopes at its foot are covered by impenetrable green jungle, and abound with dens formed of fallen blocks of rocks, the suitable retreat of tigers, bears, and hyænas. The western slopes are less rugged, but the soil is parched and the forests seem withered by excess of heat. The summit of the mountain presents a mixture



185.—Horns of Gour.

of opens, lawns, and woods. There were once twenty-five villages on Myn Pât, but these have been long deserted on account of the number and ferocity of the beasts of prey. On this mountain, however, the gour maintains his seat. The Indians assert that even the tiger has no chance in combat with a full-grown gour, though he may occasionally succeed in carrying off an unprotected calf. The wild buffalo abounds in the plains below the mountains, but he so much dreads the gour, according to the natives, that he rarely attempts to invade its haunts, and the hunting-party only met with three or four urnas (arnees) on the mountain.

The forests which shield the gour abound, however, with hog-deer, saumurs (Sambur deer), and porcupines."

It was in these wild and romantic retreats that Capt. Rogers and party hunted the gour, which when wounded turns round upon his adversary, ready to do battle. A short bellow imitated by the syllables ugh-ugh, was the only cry which the animal was heard to utter, and that not until it had been struck by the bullet. The gour is gregarious, herding together in parties varying from ten to twenty; they browse on the leaves and shoots of tender trees and shrubs, and also graze on the banks of the streams. In cold weather the saul-forests are their places of concealment, and the heats bring them out to feed on the green lawns and valleys. They do not, it seems, wallow in swamp and mire, like the buffalo. If the natives are to be credited, the gour will not brook captivity, and even when captured at an early age the mountain-calf droops and dies. The period of gestation is stated to be twelve months: the females produce their young in August. The native name of the bull-calf for the first year is Purórah, of the cow-calf Paréeah. The full-grown cow is termed Goúrin.

The gour attains to a very large size: Dr. Traill gives the dimensions of one not fully grown, which measured from the nose to the end of the tail nearly twelve feet, and stood nearly six feet high at the withers; the limbs are vigorous, clean-made, and more deer-like than bovine; the back is strongly arched, and when the animal stands still, the line from the nose to the base of the tail, along the spine, presents a nearly uniform curve. This appearance is partly owing to the curved form of the chaffron, and still more to a remarkable ridge of no great thickness, which rises six or seven inches above the general line of the back, from the last of the cervical to the middle of the dorsal vertebræ, where it gradually declines and becomes lost. This elevation is very conspicuous in gours of all ages, although they were loaded with fat, and has no resemblance to the hunch found on the withers of the zebu breed of cattle. There is not a trace of the dewlap, which is well marked in the gayâl.

The hair of the skin generally is short and sleek, having somewhat the oily appearance of a fresh seal-skin. The colour is deep brownish black, almost approaching to bluish black; between the horns is a tuft of curling dirty white hair, and over each hoof is a ring of the same colour.

The Yak.

We may here briefly notice a species of the bovine race, the Yak of Tartary (*Bos grunniens*), too remarkable to be altogether omitted in our sketch of the Ox tribe. Whether the Yak belongs to the restricted genus *Bos* is very doubtful; in some points it certainly is related to the musk-ox (*Ovibos*), at least if we are to judge from the skins, more or less imperfect, which we have had opportunities of examining. The following is the description of a skin, wanting the horns and limbs, in the Zoological Museum, London:—

Nostrils narrow, converging below, with a small naked space between them, and a narrow naked border round them, so that there is no true broad naked muzzle, as in the common ox; the ears are small and pointed; the forehead is covered with black, curling locks, but its degree of convexity cannot be accurately determined, owing to the absence of the skull. The back is covered with smooth hair, of a deep chocolate brown, a white stripe occupying the ridge of the withers, and another the centre of the croup. From the shoulders, sides, and under surface of the body, and also from the inside of the thighs, hangs a pendent mane of long hair, falling in huge masses so as to cover the limbs and almost touch the ground. This mane is grizzled black, except a central line along the belly, of pure white. The tail is tufted with a huge mass of glossy white and rather coarse hairs, 18 or 20 inches in length. In size the animal could not have exceeded the small Scotch breed of cattle.

On the authority of Gmelin and Turner, the horns are round, small, pointed, and bent in a semicircle forwards. The withers are elevated, and the colour is said

to vary. We have seen an example in which the tail was black.

The yak is a native of the mountains of Thibet, and when wild is said to be savage and dangerous; it is, however, reclaimed, and a domestic breed is kept by the natives of the range tenanted by the animal in its wild condition. The yak is perhaps the Poephagus described by Ælian; from an early period its tail was used as a standard by the Mongols and Tartars, being one of the distinguishing insignia of superior officers. In India these tails are mounted on ivory or silver handles, and, under the name of chowries, are used to brush away the flies; elephants of state are taught to carry a splendidly mounted chowrie in their proboscis, and wave it backwards and forwards.

Of the habits of the yak in a state of freedom little or nothing is known. As regards the domestic yak, Turner, in 'Account of an Embassy to China,' after giving a description of it, observes that "these cattle, though not large-boned, seem, from the profuse quantity of hair with which they are provided, to be of great bulk; they have a downcast heavy look, and appear, what indeed they are, sullen and suspicious, discovering much impatience at the near approach of strangers. They do not *low* loud, like the cattle of England, any more than those of Hindustan, but make a low grunting noise, scarcely audible, and that but seldom, when under some impression of uneasiness. These cattle are pastured in the coldest parts of Thibet, upon the short herbage peculiar to the mountains and bleak plains. The chain of mountains situated between the latitudes 27° and 28° N. lat., which divides Thibet from Bootan, and whose summits are mostly clothed with snow, is their favourite haunt. In this vicinity the southern glens afford them food and shelter during the severity of winter; in milder seasons the northern aspect is more congenial to their nature, and admits a wider range. They are a very valuable property to the tribes of itinerant Tartars called Duckba, who live in tents, and tend them from place to place; they at the same time afford their herdsmen an

easy mode of conveyance, a good covering, and wholesome subsistence. They are never employed in agriculture, but are extremely useful as beasts of burden, for they are strong, sure-footed, and carry a great weight. Tents and ropes are manufactured of their hair, and amongst the humbler ranks of herdsmen I have seen caps and jackets made of their skins. The best requital with which the care of their keepers is at length rewarded for selecting them good pastures, is in the abundant quantity of rich milk which they give, and in the butter produced from it, which is most excellent. It is their custom to preserve this in skins or bladders, and the air being thus excluded from it, it will keep in this cold climate throughout the year; so that after some time tending their herds, when a sufficient store is accumulated, it remains only to load their cattle and drive them to a proper market with their own produce, which constitutes to the utmost verge of Tartary a most material article of commerce."

Genus Anoa :—

The Anoa (*Anoa depressicornis*).

Our figure represents the horns of this rare animal, which has been considered by some naturalists as belonging to the antelopes, by others to the Ox tribe (Fig. 186) : this uncertainty arises from the circumstance that though the animal has been noticed for many years, only a few fragments of skulls and horns have hitherto been brought to Europe.

The horns are erect, perfectly straight, and in the plane of the forehead; they are about the same length as the head, that is, about nine or ten inches, strongly depressed or flattened in front, of nearly the same breadth till within three inches of the extremities, whence they are rather attenuated to the tips, which are bluntly pointed, and irregularly wrinkled, or rather crumpled throughout the greater part of their length. The head is long and narrow, terminating in a broad muzzle.

Mr. Pennant is the first naturalist who has mentioned this animal, but he has given no account of its characters, and merely relates, that it is about the size of a middling sheep, is wild and fierce, and resides in large herds among the rocky mountains of the island of Celebes. He considers it as a small species of wild buffalo, and adds, that it is captured only with great difficulty, and is so fierce in confinement, that some of these animals,

186.—Horns of Anoa.

belonging to Governor Loten, in one night ripped up the bellies of fourteen stags which were kept in the same paddock with them. The next author who mentions the anoa from original documents or personal observation is Colonel Hamilton Smith, who in the fourth volume of Griffith's translation of the 'Règne Animal,' describes

the head and horns, and considers the animal as a species of antelope. Colonel Smith's fragment was brought from Celebes by the late Dr. Clarke Abel, who obtained it on his return from China in the suite of Lord Amherst; but since that period various other heads have been brought to Europe, some of which are deposited in the British Museum and in the collection of the London Zoological Society.

Genus Bubalus.

The Arnee, or Urna

(*Bos Arni* of Shaw and others).

The Arnee is by some naturalists regarded as nothing more than the wild ordinary buffalo; but we are inclined to the opinion that it is a distinct species, as we think is clearly evidenced by the characters of the horns, which are not uncommon in museums, though no specimen of the animal itself exists in Europe. It tenants the high lands of Hindustan, and is known in Bengal and the neighbouring provinces by the name of Urna. It is described as a large and formidable beast, conspicuous for strength, courage, and ferocity. The horns of this animal, which we have figured (Fig. 187), are remarkable for their enormous size, often measuring from four to six feet in length. They rise upwards, first inclining outwards and backwards, and then, arching gradually towards each other as they proceed to the points, form together a bold crescent; they are compressed on their anterior and posterior surfaces, and rough with numerous transverse furrows and ridges. The chaffron is narrow and convex.

The Common Buffalo (*Bos Bubalus*).

The buffalo has been long domesticated in India, where its services as a beast of draught and burden render it extremely valuable. From India it has spread into Egypt, Greece, Italy, and Spain.

187.—Horns of Arnee.

The buffalo differs materially in its form and general aspect from the ox, being a heavier and more clumsy animal, as well as more powerful. Though lower in stature than the bull, it is more massive in the body, which is supported on short, thick, solid limbs; the hide is coarse and dense, covered rather sparingly with black wiry hair. The head is large, and carried with the muzzle projecting; the forehead is convex, the muzzle large; the horns are compressed, and lie back, turning up laterally and often attaining to a large size, but the direction seldom allows the points to be used for goring; the ears are large and pendulous; the dewlap is small; the

eyes are wild, savage, and malicious in expression; the tail is long and slender.

In its native regions the buffalo is a formidable animal, and capable of contending with the tiger, which is often foiled in the deadly strife. (Fig. 188.) When excited, the beast rushes desperately on its foe, strikes him down with the horns or forehead, kneels upon him, crushing in his chest, and then tramples on the lifeless body, as if to satiate its vindictive fury. Its natural temper, indeed, renders it difficult to tame and difficult to manage, while its prodigious strength and adaptation for certain localities render it a valuable acquisition.

The following remarkable instance of the sagacity, courage, and attachment of the buffalo is taken from the Singapore 'Free Press' of April 13th, 1848:—"In the month of March an occurrence took place in the division Modjokerto (residence of Sourabaya) which deserves to be brought to general notice, as a new and striking proof of the attachment of animals towards their purveyors. The local authorities of the division have inquired into the truth of the facts mentioned below; there cannot, therefore, be the least doubt about the matter. On the 14th of March a boy eight years of age, in the Dessa Gilang, was herding some buffaloes in a wood not very distant from the village, when he was unexpectedly seized and dragged away by a tiger. At the cries of anguish uttered by the boy two buffaloes immediately came running up, one of which attacked the tiger with such success that he released the boy and seized the buffalo above the knee-joint; on which a short fight ensued between the buffalo and tiger, which ended in the flight of the latter. In the meantime the other buffalo had placed himself above the body of the boy, which was lying on the ground, in such a way as to cover it entirely and to protect it against a second attack of the tiger. The people in the neighbouring Dessa had in the meantime armed themselves and pursued and killed the tiger. The life of the boy, although he was severely wounded by the tiger on the right thigh bone, is not yet despaired of. The peculiar

188.—Tiger and Buffalo.

attachment which the two buffaloes in this case showed towards their herd, is explained by the circumstance that for the most part the young natives, who take care of the pasturage of these animals, bestow extraordinary attention on one or more of their flock, that they generally remain in their vicinity, and sometimes pass a large portion of the day on their backs."

The hot morass teeming with pestilence is the genial abode of the buffalo, and its delight is to wallow in the stagnant water, where it will luxuriate for hours during the heat of the day, with its black muzzle just elevated above the surface. Its flesh is hard and unsavoury, but the milk of the buffalo-cow is of peculiar richness, and in the East a considerable quantity of butter is procured from it. The hide is greatly esteemed for its solidity and toughness. Colonel Sykes states that the long-horned variety of the buffalo is bred in great numbers in the Mawals, or hilly tracts along the Ghauts: "In those tracts much rice is planted, and the male buffalo, from his superior hardihood, is much better suited to resist the effects of the heavy rains and the splashy cultivation of the rice than the bullock. The female is also infinitely more valuable than the cow, from the very much greater quantity of milk she yields."

Dillon states that the buffalo at Malabar is larger than the ox, with white eyes, and flat horns often two feet long; its legs are thick and short: "It is an ugly animal, almost destitute of hair, goes slowly, but carries very heavy burdens. Herds may be seen, as of common cows, and they afford milk which serves to make butter and cheese; their flesh is good, though less delicate than that of the ox: the animal swims perfectly well and traverses the broadest rivers; besides the tame ones, there are wild buffaloes, which are extremely dangerous, tearing men to pieces, or crushing them with a single blow of the head; they are less to be dreaded in the woods than elsewhere, because their horns often catch in the branches and give time for the persons pursued to escape by flight. The skin of these animals serves for an infinity of purposes, and even cruses are made of

them for holding water or liquors: the animals on the coast of Malabar are almost all wild, and strangers are not prevented from hunting them for their flesh." In Ceylon, as in Malabar, the buffalo exists both in a wild and domesticated state, and the tame herds are not unfrequently joined by wild individuals, which the inhabitants sometimes entrap and at other times shoot. Buffaloes, it would appear, are more common in Bombay than in Bengal. At Boitpoor, Bishop Heber was shown a white buffalo, probably an albino, which was pointed out by the Indians as a rare curiosity.

From India the buffalo is distributed throughout Siam, Cochin-China, Malacca, and the adjacent islands, as Sumatra, Java, Borneo, &c., together with the Philippines; it is also common in China, where it is used in the various labours of agriculture.

Mr. Marsden, in his valuable History of Sumatra, has given a minute description of the breed of buffaloes in that island.

The Carbow, or Sumatran buffalo, constitutes a main part of the food of those eastern islanders, and is the only animal they employ in their domestic labours.

The Malays and other people on the coast not only train them to draught, but to the plough, as the Chinese and Cochin-Chinese do their buffaloes. The superior docility of the animal in these countries is no doubt chiefly attributable to the treatment it receives and the patient character of its masters. Mr. Marsden says, "Though apparently of a dull, obstinate, capricious nature, the carbow acquires by habit a surprising docility, and is taught to lift the shafts of the cart with its horns, and place the yoke, which is fixed to those, across its neck; needing no further harness than a breast-band, and a string which is made to pass through the cartilage of the nostrils. They are also, for the service of the Europeans, trained to carry burthens suspended from each side of a pack-saddle, in roads or paths where the use of carriages is impracticable. It is extremely slow, but steady in its work." It does not appear to be of so hardy a constitution as the domesti-

cated buffalo of the South of Italy, for Mr. Marsden informs us that the least extraordinary fatigue, particularly during the heat of the day, is sufficient to put a period to its life, which is at all times precarious. It is subject to an epidemic distemper, for which no remedy has yet been discovered. The natives of Sumatra use neither milk nor butter, but the great part of those articles of food required by the Europeans there is supplied by the carbows, whose milk is richer than what is produced by the cow; though not in the same quantity.

The female carbow goes nine months with calf, and suckles during six, from four teats. When crossing a river it exhibits the singular sight of carrying its young one on its back. Its cry is weak and sharp—very unlike the lowing of oxen.

The carbows of Sumatra are of two sorts—the white and black. Both are employed in labour; but the natives will rarely eat the flesh of the white kind, saying that it is unhealthy and produces blotches all over the body. Mr. Marsden and others have indeed supposed that the whiteness is a disease in the animal itself, as is the case with the albinoes or white negroes. We may observe, however, on the authority of Captain Lyon, that there are white buffaloes also in Africa. Black, or a very dark hue, however, is the predominant, and seems almost to be the natural colour of this animal. Of the thousands of buffaloes, says a correspondent, which he observed in Italy, he never saw one of any other hue than coal black.

The carbow is said not to be properly a wild animal of Sumatra, though it abounds in every part of the island. This appears to be confirmed by the name of *carbow gellan* (stray buffaloes), which the natives give to such as are found in the woods. "Most probably," says Mr. Marsden, "they were at first wild, but were afterwards, from their use in labour and food, all catched and domesticated by degrees, or killed in the attempts to take them. When they now collect in the woods, they are said to be stray cattle; as the people of a conquered province, attempting to recover their natural

liberties are styled rebels. They are gregarious and commonly found in numbers together, on which occasions they are much less dangerous to passengers, than when met with singly." Mr. Marsden also notices this animal's antipathy to a red colour.

The Sumatran buffalo has very little hair, except a bunch at the extremity of the tail: its hide appears to be almost naked. The tail does not descend lower than the middle joint of the leg. The horns sometimes, but very rarely, point forward, they are always in the plane of the forehead, resembling in this respect all other buffaloes, and differing from every other kind of cattle. These horns except at the points, are rather square than round; from the quantity of solid substance they contain, they are valuable in manufacture. The buffalo, as we have stated, is also domesticated in the Crimea, where it is extensively employed by the Tartars as a beast of draught, but from the peculiarities of that climate, which is subject to severe cold as well as heat, the animal seems even more difficult to manage than in Italy.

In Africa it is abundant along the Nile, and in other districts, existing in a wild or emancipated state, as well as in a state of domestication. In Abyssinia, more particularly in the forests of Ras el Fil, the buffalo is very common; its skin is chiefly employed in that country for the making of shields, in which considerable art is displayed.

In the middle ages the buffalo was introduced into Spain and Italy, where in course of time the animal became naturalized, and in some districts may be regarded as in a state of nature.

We have already alluded to the Maremma of Italy; in the worst parts of that pestilential tract of country, there the savage buffalo may be seen, roaming at will, under the care of wild keepers, buffalari, whose lives are passed in this dangerous employment.

The following communication, on the habits, manners, and general treatment of this animal as it exists at the present day in Italy, is so interesting that we have great pleasure in presenting it entire to our readers. It is the

result of personal experience, and on that account alone would be valuable, independent of its conveying so full an account as to require nothing to be added to it.

"Buffaloes were introduced from Africa to Europe during the middle ages, and in course of time were thoroughly naturalized and greatly multiplied in Spain and Italy, to which countries of our continent they are still almost confined.

"More than one of the old Italian chroniclers who wrote when the animal was still a rarity, describe it as a wild ox from Pagan lands, and speak with something like horror of its fierce disposition, its tremendous strength, its fatal horns, red eyes, and thick fuliginous body. And indeed, confronted with the quiet milk-white or fawn-coloured steers of Italy, the buffalo is somewhat diabolical both in disposition and appearance. It was soon, however, ascertained that the buffalo was a very valuable animal, that could flourish and increase in the congenial climates of the south without requiring much attention from man. Wherever there were unhealthy marshes unfit for almost every other purpose, or stagnant pools and damp underwoods, there these African herds would thrive in perfection. Unfortunately the wars that produced and followed the fall of the Roman empire, by removing an intelligent and industrious population, left throughout the Italian peninsula vast and numerous tracts of this sort, where, from want of draining, from the exuberance of vegetation, and from that rapidity with which Nature will everywhere make a wilderness and a desolation, when man is withdrawn from the struggle with her, the country became insalubrious, swampy, and wild in the extreme. In these tracts the buffaloes were turned loose, and left to range almost in a state of nature, acknowledging a doubtful allegiance to a few miserable peasants, who contrived to milk the cows and now and then to take away a buffalo calf, in either of which operations their lives were often put in jeopardy by the savage character of the species. In several places they multiplied so rapidly, and so completely enfranchised themselves from the control of man, that it became necessary to hunt them like wild cattle.

"The face of Italy has been wonderfully improved since the middle ages, and there are now many districts, where the buffalo, much tamed in his disposition, is bred, that have long ceased to be pestilential swamps; but still the stations where he most flourishes, and which are best suited to his habits, are such as have been described, and in them he may be said still to be almost in a savage state. Wherever large herds of buffaloes occur, they may be taken as the sure index of *malaria*. In the wild provinces of the Calabrias, where most of the plains and valleys are always partially swamped by the Laino, the Chratis, the Amato, and numerous other rivers and torreuts, they are very common; they range, almost the only occupants, over the plains of Pæstum, and the still wilder and more extensive flats of Apulia. The Pontine Marshes offer them a favourite retreat, and in the pestilential Maremme both of Rome and Tuscany, scarcely any other animals, except wild boars, are ever seen. In northern Italy, where there is infinitely less malaria than in the south, they occur in greatest numbers where the causes of that pest exist, and where its effects are often felt, in the inundated rice-grounds of Lombardy, in the marshes formed by the overflowing of the Po, the Tanaro, the Ticino, or of some other rivers or lakes.

"The writer of this communication has had frequent opportunities of observing buffaloes in all the places mentioned, and in many others not necessary to enumerate. Their habits seem to be the same everywhere, and to differ little from what they are in their wild state.

"The chief delight of their lives, during the heat of summer, seems to be to wallow in water or mud. After they have well rolled themselves they will often remain imbedded for hours without moving, leaving little more than their black snouts visible above water. If disturbed in this enjoyment they are very apt to become sulky and dangerous. They must find nourishment in aquatic and other plants not suited to cows, for they will not only exist, but thrive, where half the same number of cows would be half starved. They are subject, how-

ever, to rapid decline and mortality in case of the failure of water and mud to wallow in. During the writer's residence in the country, part of the province of Apulia was visited by a dreadful drought; insufficient supplies of water were brought from great distances, and in many places the farmers were obliged to eke it out by mixing wine (of which they had a plenty at a very low price) with it. With this beverage they contrived to prevent any great mortality among the rest of their cattle, but they were far from being so successful with the buffaloes. The pools and wallowing places of these animals were not merely dried up—they were literally baked like bricks—and without these resources, essential to the animal's existence, not even wine and water could keep them alive. Before the regular autumnal rains came to the succour of that African-like country, great numbers of them had perished. Woods and thickets, or at least plenty of brushwood or reeds, seem to be, if not altogether so essential, greatly conducive to the animal's comfort. In the Maremme and in the plain of Pæstum, they are constantly seen to retire to dense thickets, at certain times of the day, after they have wallowed in the mire. The wild buffaloes of South Africa can scarcely surpass them in the facility with which they force their way through an entangled wood.

"The thickets on the Pæstan plain are chiefly composed of gigantic myrtles, frequently rising ten or twelve feet, and of other evergreens. They are called in the dialect of the country 'macchioni,' and sometimes the only paths across the desert run through them. Here the traveller is liable to be startled by hearing of a sudden a savage noise, between a snort and a grunt, or to see close to him, the black fierce-looking head of a buffalo, with blood-shot eyes, peeping through or over the thick shrubs, and turning up his nose as if in scorn. The expression is habitual to and very characteristic of the buffalo. He does not carry his head quietly and modestly like the ox, but thrusts it forward, bringing the facial line nearly horizontal with the neck, and carrying his snout upwards like a wild boar. Though the brute can scarcely be supposed to have

such a sentiment as contempt, he certainly exhibits what we look upon as a manifestation of it, turning up his nose at every thing.

"The sudden sight of these powerful and ill-tempered animals in the solitary macchioni, is certainly rather startling; but except at particular seasons, or at loud noises, or attempts to scare them away, or the exhibition of some glaring colour, no attack from them is to apprehended, though from the treacherous-like manner in which they skulk close to you, it seems every moment imminent. A German artist, who went to sketch the magnificent remains of the neighbouring temples, incurred considerable risk by pulling out a red bandana pocket-handkerchief, and the writer himself had once a narrow escape in attempting, after the fashion of the buffalari, on horseback with a long spear or goad in his hand, to drive some half dozen of them from one place to another. Their charge, in which they bring their muzzles under and close to the ground, and bring their thick horns upwards, has a very formidable appearance.

"Here, and in every other part of Italy where they are bred, buffaloes are much used as beasts of burden Their prodigious strength renders them available in many emergencies when the oxen of the country, though large and powerful, entirely fail. An Italian officer has favoured us with the following details from his own observations in the States of Parma and Piacenza :—

"During the building of the new theatre at Parma by Maria Louisa (Buonaparte's widow), I have seen six, and I believe sometimes eight, buffaloes, transport one by one the immense columns of the façade, which are all of one piece of marble, and of a weight that you may conceive from their size and material. This they did with such ease as surprised every body, while I am convinced from experience that twenty-four of our best oxen would not have been able to move one of the columns. These marble columns were brought as near as Sacca on the river Po, by water, but from Sacca to Parma is a distance of more than twelve miles, and this the buffaloes performed in one stage without stopping.

"As to the passage of the bridge on the Taro, where

I witnessed another extraordinary proof of the strength of these animals, the fact was simply this:—Marshal B——— had been on business at Parma, and was in a great hurry to return to Milan; I was charged by Maria Louisa to attend him as an escort of honour, as far as Piacenza. We set out in horrible weather, and it had rained the whole of the preceding night and day. On arriving at the Taro we found that torrent in a fearful state, nor was it possible to pass it except by the new bridge which was not yet finished. Nobody had yet passed it, and the approaches to it on either side (the bridge being built very high) were not only steep, but composed of deep loose earth, which had not been beaten or secured. It was determined, however, that we should attempt the ascent; but scarcely had we got a third of the way up, when the carriage sunk in the mud to the axles of the wheels, and stuck fast, in spite of the efforts of four excellent post-horses, and two pair of oxen put to, to assist them. After toiling for an hour, the thought came into my head to try buffaloes, of which I saw some on the opposite side of the torrent. Only one pair was brought over to us, and the oxen being removed, these animals were put to, in front of the foremost pair of horses. Although the horses were almost exhausted by the labour they had undergone, and one of them, frightened at the unusual company of the buffaloes, offered resistance rather than assistance, yet this single pair of robust animals, snorting and blowing a little at first, moved the carriage and dragged it upon the bridge. While thus ploughing with the carriage axle-tree deep, they were themselves nearly up to the chest in mud. B—— could scarcely credit the evidence of his senses. When we were about half way over the bridge, the peasants who had gathered round the carriage to lend a hand, or to obtain a present, making a little confusion, and, as usual with them, a great deal of noise, one of the buffaloes took fright and became unmanageable—and thus exposed not only the Marshal, carriage, horses, and postilions, but your humble servant, the escort of honour, to the hazard of being drowned in

the roaring torrent below, for our new bridge had neither parapets nor any kind of protection at its sides. Having caused the peasants to make a retrograde movement, and hold their tongues, we waited the event. The restive buffalo, on finding itself alone with its master or conductor, who then ventured to approach and caress it, immediately became quiet, and, with his companion, dragged the Marshal's carriage safely over the bridge. We had then to pass my own carriage, and this was done with equal ease by the same pair of buffaloes. In campaigns I have served in, how many pieces of artillery we were obliged to abandon, might have been saved by means of buffaloes!

"In the south of Italy, where they are infinitely more numerous than in the provinces to which our friend refers, buffaloes are always used when great strength is required. In many parts of the kingdom of Naples they are quite as common as beasts of draught, as oxen, and much more common than horses. An Englishman looking only at his own country, with roads level as bowling-greens in all directions, and with breeds of horses suited to every variety of work, will hardly understand this—but in the countries of which we speak, the roads, except a few of the principal ones, are very bad, the horses though spirited are undersized, and the carts and waggons in general are preposterously huge and heavy, and of the very worst construction. Mules, that do not draw, but carry their burdens on their backs, are very generally employed—they are also harnessed to "vetture" or stage-coaches, but there is much work which they could not perform.

"In some of the marshy plains of Calabria, in particular, communication would be almost impracticable were it not for the buffalo. There are not only morasses, swamps, and bogs in every direction, but rivers suddenly swollen to torrents in rainy weather, and unprovided with bridges of any sort, frequently occur. Horses, mules, and oxen would inevitably stick fast in such tracts as these; but a pair of good buffaloes, working chest deep in the mud, will, slowly indeed, but surely, drag a

large *carro* with its goods or passengers through them. To pass the rivers the inhabitants harness the buffaloes to high carts, with wheels of prodigious diameter, so that the platform of the vehicle is considerably above the buffaloes' heads. The animals, from their natural habits, take readily to the water, and provided it does not entirely cover them, they will drag the cart to the opposite bank. The writer of these pages has seen feats of this sort that excited his astonishment. In one instance, on crossing a broad, muddy, sluggish stream, the buffaloes suddenly sank entirely below water, which began to ooze into the awkward vehicle,—the driver roared out with all his might, and with a tremendous effort the animals moved the cart forward, and got to shoaler water, or a harder bottom ; but even then, little more than their black snouts, through which they blew violently, appeared above the surface of the stream. After allowing them a little breathing time, the driver set up another shout or roar, and struck them with a long goad he held in his hand. At this warning they renewed their efforts, and snorting and blowing, and throwing up the water (in which, and in mud, they were almost buried the whole way), at last reached terra firma, if a quagmire might be so called.

"On the great plain of Apulia, their services are almost equally valuable. On the edges of that pastoral desert a great quantity of corn is grown, the marts of which are the towns of Foggia, Manfredonia, and Barletta. To reach those places it is generally necessary to cross more or less of the wide plain, where there can scarcely be said to be any road, every muleteer, waggoner, or traveller shaping his course as he chooses across the desolate flat, much in the same manner as the Arabs do in the Syrtis or other deserts. In some parts of this plain there are tracts of loose, deep sand, and in others, pantani, or swamps, which in rainy seasons are deeply covered with water.

"Now the mules, so much used, and so excellent in the steep, rocky mountainous parts of the country, do not like either the sand or the swamp, and, to say

nothing of the casualities to which they are exposed, it would take a large string of mules to carry on their backs half the quantity of corn that a pair of buffaloes will draw in a waggon.

"There are few better places for observing the labours and habits of buffaloes than the great town of Foggia, which rises like an island in the Apulian flat. There they are seen to arrive in all directions, slowly toiling over the plain, with their cumbrous waggons behind them, and their drivers walking at their heads. In summer the heats are intolerable, and the shade of a single tree is not to be found,—the plain, in some parts, swarms with gad-flies and other insects, that drive mules, horses, and even the quiet oxen almost mad; in winter the expanse, open on one side to the stormy Adriatic, is frequently swept by tremendous hurricanes, and when it rains it rains almost as it does between the tropics. Yet in all seasons the buffaloes, exempted from some of the evils to which other animals are exposed by the extraordinary strength of their constitution and from others by the thickness and toughness of their skin, will perform their useful labours.

"It is a curious though rather melancholy sight to meet on the plain, yoke after yoke of these dingy, red-eyed animals, whose appearance is always most gloomy and sulky, and whose pace is as measured as that of the camel. As they arrive at the entrances into the town, the cars halt in a long caravan-like line, and the buffaloes are unyoked, and provided with some water and coarse provender. If not immediately liberated by their drivers they throw themselves on the ground in a fury. In places where stagnant water is at hand, it is almost impossible to prevent them from rushing to it; but at Foggia there is nothing of the sort, and indeed water of any kind is at times rather scarce. Those drivers who are careful of their animals, generally contrive, however, to throw a little water over their flanks, or on the ground where they are about to lie down. A bundle of the broad leaves and stalks of the Indian corn well moistened in water, seems to give them peculiar satisfaction when

placed under them. Like the camel, after their day's toil, they, for the most part, pass the night in the open air, requiring no care from man. A stranger, however, should take care not to get involved among them on a dark night, as when disturbed they are not so patient as the good-natured camels under the same circumstances. These animals, indeed, are often known to attack their own driver and the man who feeds them, and dreadful accidents are by no means uncommon in the districts where they are much in use. They are generally described by those most familiar with them, as being stupidly malignant and ferocious, and altogether incapable of that feeling which attaches other animals to kind masters. It is evident, however, that even their enormous strength is often over-taxed; that they are over-worked and cruelly treated. In one instance that fell under the writer's observation, in which the rage of a buffalo proved fatal to a human life, it appeared that the animal could very well draw a distinction between good treatment and bad. This animal was driven to Foggia by a man who had often driven him before without accident—the day was a very bad one, and parts of the plain they crossed were in a sad state from recent rains. The driver, impatient to reach the town, would proceed without allowing the animals sufficient rest. It was seen by other drivers, going the same route, that the heavily-laden cart frequently stuck deep in the mud, and that the man cruelly goaded his yoke of buffaloes to make them drag on. As he at last reached his usual halting place at the edge of the town, he unyoked, when no sooner did one of the buffaloes feel himself at liberty than he rushed at the man, knocked him down with a blow of his head, and then savagely threw himself on his knees upon the prostrate body. There were several spectators close at hand, and among them some bold and experienced buffalo-drivers; but before they could secure the infuriated animal, he had so kneaded the victim of his revenge that the blood gushed from his mouth, nose, and ears, and he was dead.

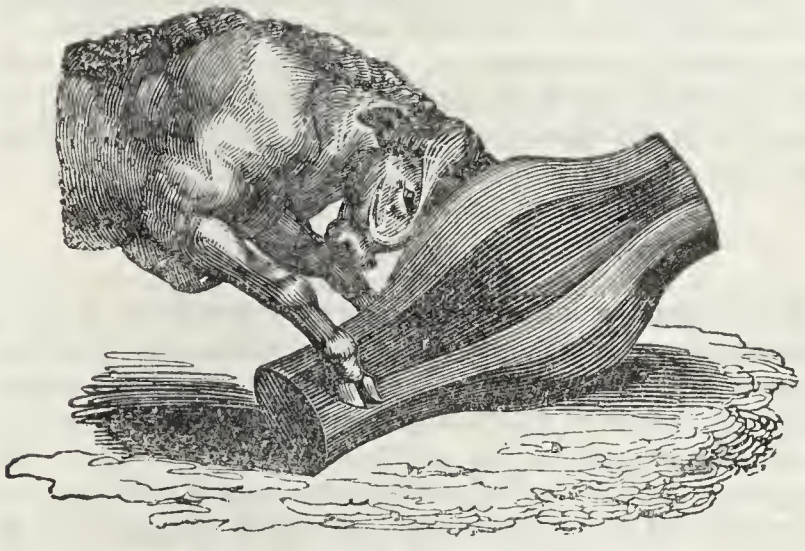
"At the great fair held at Foggia, at the end of May and beginning of June, immense droves of almost

wild buffaloes, presenting when thus condensed a most formidable appearance, are brought to the town for sale. They are collected in the tenute, or cattle-farms, or in the wildernesses where they have hitherto roamed, and driven to the fair by buffalari, all well-mounted, and furnished each with a long goad, not unlike a Cossack's spear. These men, who come from various parts of the kingdom, are almost as wild-looking as the cattle they conduct. They are excellent horsemen, very expert in the use of their goad or lance, and long couteau de chasse, which (generally accompanied by a large pistol) they always carry upon their persons. Indeed they not only look a warlike band, but might prove such, and be employed as excellent light troops without any addition to their ordinary equipment. The mass of the Cossacks in the last war were neither so well armed nor so well mounted as these cattle-drivers.

"During the fair of Foggia, the buffaloes are enclosed in a large square, in which, from their great numbers, they are often much crowded. Every buffalo, and at every season, smells more or less of musk; but from the heat, crowd, and their multitudes here, this part of the fair is more strongly perfumed with musk than ever was a London drawing-room, even when that noxious odour was most in fashion. To enter into this almost 'solid square' of ferocious animals, as it is necessary for purchasers to do, seems rather a nervous task to a stranger. The buffalari make way with their spears, and shout and whistle to their respective herds in a peculiar manner. Accidents, however, are not uncommon. Sometimes a buffalo, becoming furious, breaks away from the square, runs madly through the town, and as the streets are crowded at that season, he is almost sure to do some mischief. The cry of 'Buffalo scappato' is indeed a cry of terror. On level ground the speed of the animal is very considerable, but he labours under a disadvantage in descending a hill, as his fore legs are shorter than his hind legs. He also runs with blind fury, straight forward, and may be turned and dodged with success. Still, however, everybody in Apulia and the other places where these animals abound, allow that they are

very much to be dreaded when in a state of irritation. They follow their victim with great pertinacity, and if they reach him they throw him down, kneel on him, and, it is said, never leave the body until they hear that respiration has ceased. From the manner in which their horns are turned back, they can rarely make any use of their points.

"Two friends of the writer, an English gentleman and an Italian, whilst traversing on foot a lonely part of the Campagna of Rome, were suddenly set upon by some buffaloes, and narrowly escaped by creeping under the low arch of a bridge that crossed a ditch, in which uncomfortable place they were obliged to remain a considerable time, until the brutes chose to depart."



189.—La Botta.

The buffalo, as well as the bull, is baited in the amphitheatres of Italy. One kind of sport with the buffalo is called *La Botta*. (Fig. 189.) A large tube made of wicker-work or other flexible materials, well wadded without and within, and open at both ends, looking in short like a cask or butt (whence its name) with the ends stove in, is rolled across the arena. Presently a man creeps into this botta, and then lifting

it up on end, rises on his feet and begins to move, with his head peeping above the cask, towards the buffalo, who at first stares bewildered at the sight, and then runs and upsets the novel object. In this game the man must be careful, when the charge is made, to draw in his head and legs, and keep himself entirely covered like a tortoise in his shell. The buffalo, seeing that the botta no longer moves, kicks it, butts at it for a while, causing it to roll along, and then leaves it: but presently the cask is again raised on end, and moved by the man towards the beast. This trick could not be played with the Toro Vaccino, whose sharp and strong horns, better placed for attack than the buffalo's, would pierce the cask through and through.

The attack of the buffalo in the arena is more dangerous than that of the bull, and in his rage, when he has missed his tormentor, he often strikes the wall furiously with his head and horns, making fragments of stone fly in all directions, apparently without suffering any injury from the violence of the shocks.

The Cape Buffalo (*Bos Caffer.*)

This ferocious animal is a native of southern Africa, associating generally in troops, frequenting the watered glens and ravines among the hills. Like the common buffalo it is fond of wallowing in pools or swamps, where it sometimes passes the greater part of the day. Its temper is depicted in its lowering eye, and the malevolent expression of the countenance, to which the position of the horns overshadowing its fiery eyes not a little contributes. These weapons form at their base a solid rugged mass, covering the forehead, from which they bend downwards, and somewhat outwards, gradually diminishing to the points, which suddenly curve upwards. The distance between the points of the horns is frequently five feet, but the rugose massive base of each is in contact, forming an impenetrable helmet; their colour is black. The ears are a foot in length, pendent, and in a great measure defended by the horns; yet it is ob-

190.—Cape Buffalo.

served that they are always torn and jagged, either from the wounds received in their combats with each other, or from the laceration of thorns and spines, the animals continually forcing their way through the dense thickets. Though not taller than an ordinary ox, the Cape Buffalo is a far stouter, heavier, and more powerful beast; its limbs are short and thick, its body bulky, and its head ponderous. The hide is thick and tough, and sparingly covered with harsh blackish hairs, those on the under-lip and about the corners of the mouth being elongated so as to form a scanty beard. (Figs. 190 and 191.)

Considering the massive proportions of this fierce tenant of the wilds of southern Africa, it possesses no inconsiderable share of fleetness, and when pursued by the hunter it tears through the thicket and up the mountain-side with surprising impetuosity. Not unfrequently, however, it returns to the attack, so that it

is not to be encountered without the utmost caution and the means of escape at hand. Many are the fatal accidents and the narrow escapes from death recorded by the various travellers who have penetrated the country of the Cape buffalo.

The following account of an attack by Sparmann and his party on one of these animals, shows how difficult it is to kill the Cape buffalo; and how dangerous it is to advance when the animal falls on receiving the first discharge. It was on the borders of the Great Fish River that Sparmann on one occasion fell in with several buffaloes, "upon which," says the writer, "we advanced till within twenty or thirty paces of the beast; when, perhaps in some degree actuated by our fears, we discharged our pieces pretty nearly at the same time, while the buffalo, which was behind a thin scrambling bush, upon rather lower ground than we were, seemed to turn his head round in order to make towards us; in the mean while, however, the moment we had discharged our guns we had the pleasure to see him fall, and directly afterwards run down into the thickest part of the wood. This induced us to hope that the shot had proved mortal: for which reason we had the imprudence to follow him down into the close thickets, where, luckily for us, we could get no farther. We had however, as we afterwards found, only hit the hindmost part of the chine, where the balls, which lay at the distance of three inches from each other, had been shivered to pieces against the bones. In the mean while our temerity, which chiefly proceeded from hurry and ignorance, was considered by the Hottentots as a proof of spirit and intrepidity hardly to be equalled, on which account from that instant they ever after appeared to entertain an infinitely higher opinion of our courage than they had ever done before. Several of our Hottentots now came to us and threw stones down into the dale, though without success, in order to find out by the bellowings of the beast whither he had retired; afterwards, however, he seemed to have plucked up his courage, for he came up at last out of the vale of his own accord to the skirts of the wood,

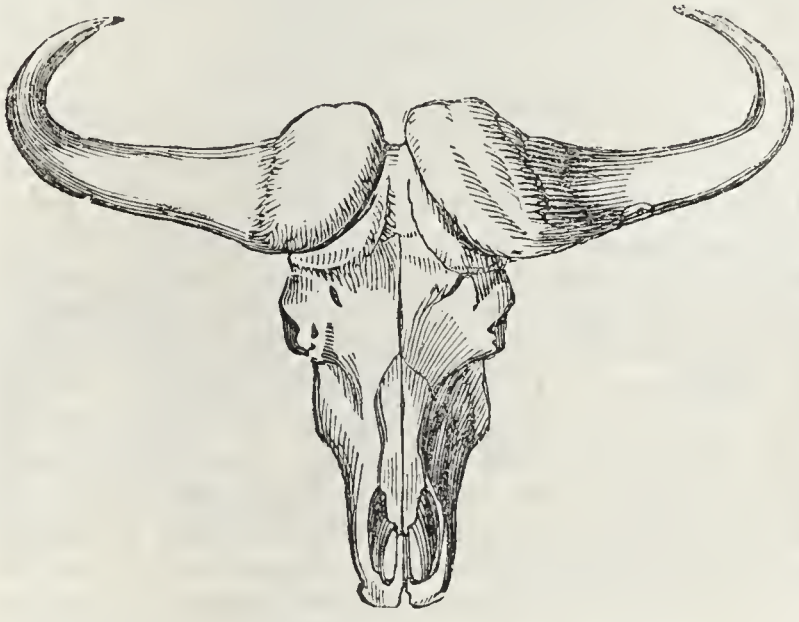
191.—Cape Buffalo.

and placed himself so as to have a full view of us on the spot where we were resting ourselves somewhat higher up: his intention was in all probability, and in the opinion of our old sportsmen, to revenge himself on us, if we had not happened to see him in time and fired at him directly. What perhaps in some measure put a stop to his boldness was, that we stood upon higher ground than he did: for several veteran sportsmen have

assured me of it as a fact, that they know from experience, that the buffaloes do not willingly venture to ascend any hill or eminence in order to attack any one. The third shot, which afterwards was observed to have entered at the belly, was fatal. This occasioned the buffalo to take himself down again into the vale, dyeing the ground and bushes all the way he went with his blood. Though still hot upon the chase, yet we advanced with the greatest caution, accompanied by two of our Hottentots, through the thin and more pervious part of the wood where the buffalo had taken refuge. He was advancing again in order to attack some of us, when Mr. Immelman, from the place where he was posted, shot him in the lungs. Notwithstanding this he had still strength enough left to make a circuit of a hundred and fifty paces before we heard him fall. During his fall, and before he died, he bellowed in a most stupendous manner, and this death-song of his inspired every one of us with joy on account of the victory we had gained; and so thoroughly steeled is frequently the human heart against the sufferings of the brute creation, that we hastened forwards in order to enjoy the pleasure of seeing the buffalo struggle with the pangs of death. I happened to be foremost amongst them; and I think it impossible for anguish, accompanied by a savage fiereeness, to be painted in stronger colours than they were in the countenance of this buffalo. I was within ten steps of him when he perceived me, and bellowing raised himself suddenly again on his legs." This was the last effort of the poor beast; but so terrified was Sparmann at the moment, that his shot missed its huge body, and having thus fired unsuccessfully he precipitately fled. On another occasion Sparmann records the destruction of a buffalo, by one of his Hottentots, who was in the utmost danger of being trampled to death. Exciting, from the risk attending it, the chase of this animal is eagerly followed, insomuch that the buffalo is now only to be met with in the interior of the country: in many parts where a few years since it was very common, not a single individual is to be found, and as the colonization

of Southern Africa continues it will become still more scarce, and have the range of its territory more and more restricted, till, with the elephant and other large beasts, it will only find a precarious shelter in the deepest forest, from which it may even be ultimately extirpated.

The bellowing of the Cape buffalo when wounded, his fury as he tears up the earth with his horns, and his efforts to revenge himself upon his foes before he sinks expiring, are terrific.



192.—Skull of Bos Caffer.

It is the general opinion of the natives of South Africa, that though the lion frequently attacks the buffalo, he cannot overcome it by dint of strength, but has recourse to stratagem, lying in ambush near some stream where the beast comes to drink. They say that the lion springs upon its back, drives its tremendous claws into the victim's sides and the nape of the neck, tearing and mangling, till the buffalo falls and dies. At other times they affirm that the lion darts suddenly upon the buffalo, fastens on its chest and neck, lacerating and squeezing

the mouth and nose with its fore-paws, till, half suffocated, and exhausted by vain efforts and loss of blood from deep wounds, it expires. The lion, however, does not always make these attacks with impunity, for his carcass is sometimes found gored and trampled, evidently by buffaloes, the herd having come to the rescue of their companion. An allied species (*Bos Pegasus*, H. Smith) is found in Western Africa.

Fig. 192 represents the skull of the *Bos Caffer*.

Genus Bison.

The Aurochs, or Zubr

(*Bison Europæus; Bos Urus*, Gmelin).

This noble species exists in the great forest of Bialowicza (pronounced Bealawezha in Poland), in Lithuania, where it is protected by stringent laws. In its proportions the auroehs is robust, and its withers are massive and elevated. The largest males stand about six feet high at the shoulders. The hair is of two sorts: one is soft, woolly, and short, covering the whole trunk and limbs; the other is long and rough, covering the upper part and sides of the head, the neck, and shoulders, where it forms a mane; under the lower jaw and along the throat to the chest it is lengthened into a sort of beard. In old bulls the mane is often a foot in length, and is thickest in November. The eyes are small, but fierce and sparkling when the animal is irritated. The tongue, lips, and palate are blue. The tail, which is short, is furnished with a tuft of stiff hairs at its extremity. (Fig. 193.) An odour, described as between that of musk and violets, is exhaled from the skin, especially from that part of the skin covering the convexity of the forehead; it is stronger in the male than the female, and may be perceived at the distance of a hundred yards from the herd.

The flesh of this animal is highly esteemed, but when roasted is said to have a bluish tinge.

Thickets near the swampy banks of rivers are the

193.—Aurochs.

favourite resorts of the aurochs; but in summer and during the warmer portion of autumn, according to Dr. Weissenborn, the herds select sandy spots: in winter they keep quiet by day in the thickest part of the fir-wood, only browsing at night, and finding sustenance in the bark of young trees: in spring they visit spots where the herbaceous plants they relish begin to sprout. They are fond of tree-lichens. The voice of the aurochs is a deep short grunt, which may be heard at a considerable distance.

"The strength," says Dr. Weissenborn, "of the zubr is enormous, and trees of five or six inches in diameter cannot withstand the thrusts of old bulls. It is neither afraid of the wolf nor bear, and assails its enemies both with its horns and hoofs. An old zubr is a match for four wolves; packs of the latter animal, however, sometimes hunt down even old bulls when alone, but a herd of zubrs has nothing to fear from any rapacious animal.

"Notwithstanding the great bulk of its body, the zubr can run very swiftly. In galloping, its hoofs are raised above its head, which it carries very low. The animal has, however, but little bottom, and seldom runs farther than one or two English miles. It swims with great agility, and is very fond of bathing.

"The zubr is generally exceedingly shy, and avoids the approach of man. They can only be approached from the leeward, as their smell is extremely acute. But when accidentally and suddenly fallen in with, they will passionately assail the intruder. In such fits of passion the animal thrusts out its tongue repeatedly, lashes its sides with its tail, and the reddened and sparkling eyes project from their sockets, and roll furiously. Such is their innate wildness, that none of them have ever been completely tamed. When taken young they become, it is true, accustomed to their keepers, but the approach of other persons renders them furious, and even their keepers must be careful always to wear the same sort of dress when going near them. Their great antipathy to the *Bos taurus*, which they either avoid or kill, would render their domestication, if it were practicable, but little desirable. The experiments made with a view of obtaining a mixed breed from the zubr and *Bos taurus* have all failed, and are now strictly prohibited."

Dr. Weissenborn adds—"I shall now conclude my description of the *Bos urus* with adverting to the peculiar circumstances under which that animal is now living in the forest of Bialowicza, which may be considered as the only primitive forest in Europe. This woodland district is level upon the whole, and swampy. It is

intersected by numerous rivulets, and a considerable river, the Narew; these have their origin in many morasses, some of which have not yet been thoroughly investigated. Its total surface amounts to about 352 English geographical square miles, of which about 60 are rushy swamps; the remainder is overgrown with Scotch and red firs, in the proportion of four-fifths; and with numerous species of deciduous trees in that of one-fifth. A list of these may be found in Baron de Brineken's 'Mémoire descriptif sur la Fôret impériale de Bialowicza, &c.' Varsovie, 1826. In this forest, where the elk is also still met with, there were, according to the census of 1828 given by Mr. Eichwald, 696 head of zubrs, and thirty or forty besides in a neighbouring wood of comparatively small extent. Mr. Jaroeki, who gives the number of them after the census of 1829, states the sum total of the adult individuals to have been at that time 663, and 48 calves besides. Whether the number has subsequently considerably decreased, as supposed by Dr. H. O. Lenz ('Gemeinnützige Naturgeschichte,' p. 419), in consequence of the Polish revolution, is to me very doubtful, as I have been assured by a Polish gentleman that the forest of Bialowieza had not, in any appreciable degree, been disturbed during that period.

"In this forest the zubr lives, under the protection of strict but no longer inhuman game-laws, as much as possible in its primitive state of locality and liberty. Yet are they so far affected by the cultivation which circumscribes them, that without the assistance of man they could not well get through the winter. During that season they receive supplies of hay at certain places, where the stacks must be well secured, otherwise the zubrs break into them, and spoil much more than they consume, by thrusting their heads deeply into the mass of hay, in order to get at the most fragrant part of it.

"All noisy occupations are strictly prohibited in those parts of the forest where the zubrs live, and when wolves are hunted it is done with great caution and but few dogs.

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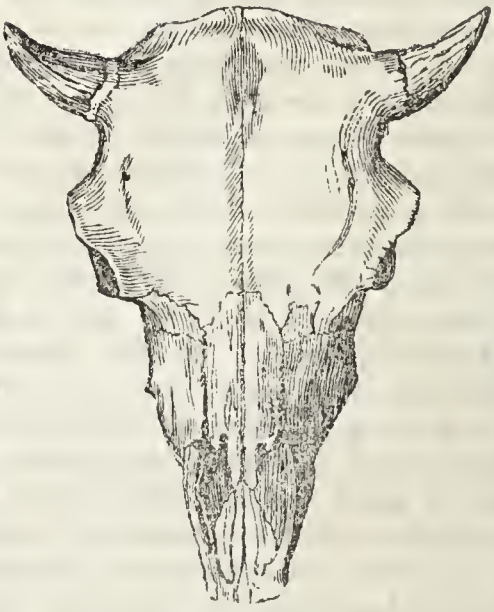


194.

195.

196.

"In our days, when one or more zubrs are to be killed, which can be legally done only by the especial permission of the Emperor of Russia, the wood is beaten up as for other game, but the drivers, who are furnished with sticks, beat against the trees, shouting 'Uhaha.' The marksmen must be posted to the leeward of the zubrs, otherwise the latter will infallibly force their way through the line of drivers.

197.

"From the time of Augustus III. down to the year 1836, the forest of Bialowicza had not been the scene of a solemn zubr-chase. On the 12th of October, 1836, however, one was held, with a view of furnishing some of the museums in Prussia with specimens; and Prince Dolgorukow, the governor-general of the province of Bialystock, who presided at it, caused it to be conducted with more than usual solemnity. Two thousand drivers

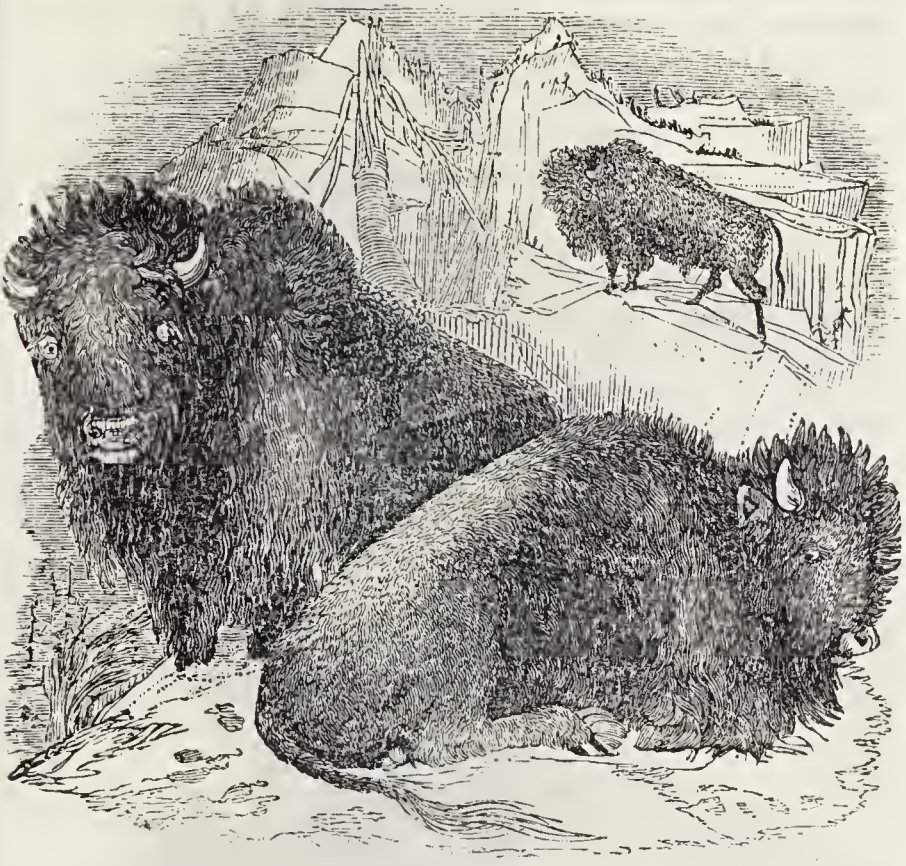
and marksmen were assembled, besides an immense number of spectators whom curiosity had drawn to the spot, where a balcony of fir-branches had been erected for the prince and his suite. Thither different herds of zubrs were driven to be fired at, and the flesh of the largest bull was dressed, to give additional interest to the concluding act of the party—a plentiful dinner."

Figs. 194 and 195 represent the skull, in front and profile, of a young auroehs; Figs. 196 and 197, of an old male.

The American Bison

(*Bison Americanus; Bos Americanus*).

The American Bison, formerly spread more extensively than at present, still exists in vast numbers in Louisiana, roaming in countless herds over the prairies that are watered by the Arkansas, Platte, Missouri, and upper branches of the Saskatchewan and Peace rivers. Like its congener the auroehs, the American bison is of powerful frame, and exceeds in bulk the ordinary race of cattle, its height at the fore-quarters being upwards of six feet, and its weight from twelve to fifteen hundredweight, and sometimes much more. The head is huge, ponderous, and carried low; the withers are massive and elevated; the eyes are small and their expression is ferocious; the horns are small and black. The neck, withers, and chest are covered with a profusion of long shaggy hair, contributing to render the appearance of the animal wild and terrific; the hinder quarters are clothed with shorter wool. The general colour is umber brown, acquiring a rusty tint in winter. (Figs. 198 and 199.) Endowed with the sense of smell in great perfection, wary and fierce, the bison associates in large herds conducted by one or two old bulls, whose motions the rest appear to follow; but herds of bulls also live separately. Their food consists of grass and rank herbage, to obtain which in winter they scrape away the snow with their feet. On the approach of an enemy the herd immediately takes to flight; but if one



198.—American Bisons.

be wounded, the life of the hunter is placed in great jeopardy, for, turning in a moment, it rushes on its assailant with headlong impetuosity and with determined resolution. (Fig. 200.) Several fatal instances might be cited in which the hunter has perished from want of caution in attacking this formidable beast, and many hairbreadth escapes are on record.

In defending itself from a dog the bison strikes violently with its fore-feet, and easily keeps its annoying foe at bay.

The flesh of this animal is accounted excellent, the tongue and hump, or flesh on the top of the withers, being especial delicacies. The chase of the bison is

therefore assiduously carried on, both by the natives and the Europeans.

The bison swims well, and during the heats of summer vast herds make their way to shady rivulets, streams, and pools, in which they delight to plunge and bathe. Herds of twenty thousand, crossing rivers upwards of a mile in breadth, have been seen, as Lewis and Clarke inform us, or darkening the plains on their passage to fresh feeding-grounds.

Salt-springs, or saline morasses, or salt-licks, are great attractions to this animal, and at all seasons are visited by numerous herds. These, however, are incesssantly thinned by the hunters, and the time is probably not far distant when the American bison will be as rare and as limited in its extent of range as the aurochs of Lithuania.

At certain seasons of the year the bulls engage in terrible conflicts, and rush furiously upon man, or any other animal which ventures near them. With the exception of man, the most formidable enemy against

199.—American Bison.

200.—American Bison.

which the bison has to contend is the huge grizzly bear, and before this dreaded monster the strongest bull goes down.

It appears that the bison will breed with the ordinary race of domestic cattle, against which the aurochs displays the greatest antipathy, though in one respect the latter approaches nearer to the common ox than does the bison; we allude to the number of ribs, which are thirteen in the ox on each side, fourteen in the aurochs, and fifteen in the bison.

Figs. 201 and 202 represent the skull front view and in profile, of a young female bison; Figs. 203 and 204, of an old male bison.

201.

202.

203.

204.

Genus Ovibos.

The Musk-Ox (*Ovibos moschatus*).

The characters of the genus *Ovibos*, as exhibited by the only known species, are as follows:—The horns are expanded at their base, forming a helmet-like mass, covering the forehead, where their edges are in contact with each other; from this mass they emerge round and tapering, first bending down between the eye and ear, and then sweeping suddenly upwards. The ears and tail are short; the eyes moderate; the nostrils oblong, and inclined to each other from above downwards; there is no true naked muzzle, but a very narrow naked line surrounds each nostril, the rest being covered with hair; there is no furrow in the upper lip. (Fig. 205.)

The musk-ox is a native of the high latitudes of North America, from the sixty-first to the seventy-fifth degree of latitude. In size it scarcely equals the smallest of the Highland breed of cattle, but appears larger than it really is from the profusion of long matted woolly hair with which it is covered, and which hangs on each side almost to the ground, almost concealing the limbs to the pasterns; the tail is entirely hidden. Beneath the lower jaw, throat, and chest the hair flows full, long, and mane-like. The general colour is dull, grizzled umber brown, darker on the sides and under surface; on the centre of the back is a brownish white mark or saddle.

The districts inhabited by the musk-ox, says Dr. Richardson, are the proper lands of the Esquimaux, and their name for it is Oomingmak. It frequents wild and rocky situations, mostly destitute of wood, feeding on grass during one season of the year, and on lichens during the other. When fat its flesh is tolerable, but at certain times both that of the bulls and cows smells strongly of musk. Though the limbs of the musk-ox are short, they are very vigorous, and the animal is fleet and active. Dr. Richardson mentions one pursued on the banks of the Coppermine, which scaled a lofty sand-

cliff so steep that the party were obliged to crawl up it on their hands and knees.

The parts of the polar regions inhabited by the musk-ox are thus described in the Appendix to Parry's Second Voyage:—

"This species of ox inhabits the North Georgian islands in the summer months. They arrived in Melville Island in the middle of May, crossing the ice from the southward, and quitted it on their return towards the end of September. The musk-ox may be further stated, on Esquimaux information, to inhabit the country on the west of Davis Strait, and on the north of Baf-

205.—Musk Ox.

fin's Bay ; as a head and horns and a drawing of a bull, being shown to the Esquimaux of the west coast of Davis Strait, who were communicated with on the 7th of September, were immediatcly recognised, and the animal called by the name of Umingmack. This is evidently the same with the Umimak of the Esquimaux of Wolstenholme Sound, who were visited by the former expedition, and of which nothing more could be learnt at the time from their description than that it was a large horned animal inhabiting the land, and certainly not a rein-deer. It is probable that the individuals, which extend their summer migration to the north-east of Baffin's Bay, retire during the winter to the continent of America, or to its neighbourhood, as the species is unknown in South Greenland."

It would appear from this, that, as is the case to a greater or less degree with all the animals peculiar to the arctic regions of America, its habits are migratory. On the above statement Dr. Richardson remarks, "The appearance of musk-oxen on Melville Island, in the month of May, as ascertained on Captain Parry's First Voyage, is interesting, not merely as a part of their natural history, but as giving us reason to infer that a chain of islands lies between Melville Island and Cape Lyon, or that Wollaston and Banks Lands form one large island, over which the migrations of the animals must have been performed."

Captain Franklin, in his Journey to the Polar Sea, has given the following account of the habits of this species :—

"The musk-oxen, like the buffalo, herd together in bands, and generally frequent barren grounds during the summer months, keeping near the rivers, but retire to the woods in winter. They seem to be less watchful than most other wild animals, and when grazing are not difficult to approach, provided the hunters go against the wind. When two or three men get so near a herd as to fire at them from different points, these animals, instead of separating or running away, huddle closer together, and several are generally killed; but if the

wound is not mortal they become enraged, and dart in the most furious manner at the hunters, who must be very dexterous to evade them. They can defend themselves by their powerful horns against wolves and bears, which, as the Indians say, they not unfrequently kill. The musk-oxen feed on the same substances with the rein-deer, and the prints of the feet of these two animals are so much alike, that it requires the eye of an experienced hunter to distinguish them. The largest killed by us did not exceed in weight three hundred pounds. The flesh has a musky disagreeable flavour, particularly when the animal is lean, which unfortunately for us was the case with all that we now killed."

The wool of this animal is fine, and some stockings which were made from it in France are said to have been equal to those made from silk. If it could be obtained in sufficient quantity, it might doubtless be employed advantageously as an article for manufacture.

THE END.

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